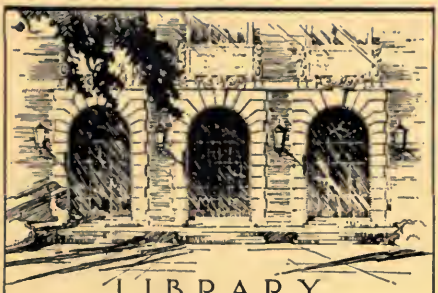

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MARKETING *The Illinois* APPLE CROP

PRESENT PRACTICES *and* HISTORICAL REVIEW

Bulletin 497

By J. W. LLOYD
and V. A. EKSTROM

UNIVERSITY OF ILLINOIS · AGRICULTURAL EXPERIMENT STATION

COVER PICTURES

Upper left: A familiar scene at Hardin, in Calhoun county, before the Illinois river bridge was built. The steamship *Golden Eagle* figured prominently in the transportation of apples from this county. In the foreground are barges loaded with apples to be propelled by power boat to East Hardin.

Upper right: The Illinois river bridge built at Hardin in 1931. With the building of this bridge, transportation of apples by river practically ceased.

Lower left: A truck taking on a load of apples at a large packing shed for delivery to the markets.

Lower right: Apples coming in from the orchard to the packing shed.

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Some of the data included in this bulletin were previously published in the following reports:

Marketing Calhoun County Apples. Ill. Agr. Exp. Sta. Bul. 312 (June, 1928), by J. W. Lloyd and H. M. Newell.

An Economic Study of Some Problems of Western Illinois Apple Growers. Farm Credit Admin. Misc. Rpt. 13 (April, 1937), by H. W. Mumford, Jr., and S. W. Decker.

Three mimeographed reports issued by the Illinois Station: *Marketing the 1937 Crop of Fall and Winter Apples in Western Illinois* (July, 1938), *The Southern Illinois Tree-Fruit Industry, Summary of a Survey* (May, 1939), both by V. A. Ekstrom; and *Trucking Illinois Fruits and Vegetables in Wartime* (February, 1943), by J. W. Lloyd and R. A. Kelly.

The last forty years of the fifty-year period covered in this study coincide with the period of active service of the senior author at the Illinois Agricultural Experiment Station.

Urbana, Illinois August, 1943

Publications in the Bulletin series report the results of investigations made or sponsored by the Experiment Station

Marketing the Illinois Apple Crop

Present Practices and Historical Review

By J. W. Lloyd, Chief in Fruit and Vegetable Marketing, and V. A. Ekstrom, formerly Associate in Fruit and Vegetable Marketing

APPLES are the most important fruit produced in Illinois. Altho they are grown in every county, commercial production has developed principally in three general areas. The western area along the Mississippi and Illinois rivers—including particularly Calhoun, Pike, Adams, Jersey, and Greene counties—now predominates in apple production; whereas formerly the area centering around Marion county and including Clay, Richland, Wayne, Jefferson, and Washington produced the most apples. Recently the second position has been taken by the extreme southern area, made up principally of Union, Johnson, Jackson, Williamson, and Pulaski counties.

This bulletin discusses the characteristics of the three producing areas designated above; traces the development of grading and packing facilities during the past forty years; discusses the introduction of standardized grading; describes the changes that have taken place in types of packages and methods of transportation; discusses apple prices, the relative importance of various sales outlets, and special mar-

Fig. 1.—Young apple orchard on typical site in Calhoun county. On many Calhoun county farms more than half the cropland is occupied by orchards. This is the most important apple-producing county in the state.

keting problems in years of heavy crop; and considers briefly the present outlook for the Illinois apple industry.

CHARACTERISTICS OF COMMERCIAL APPLE AREAS

Number of Trees

The number of bearing apple trees in the state as a whole and in the various counties has changed markedly in the past fifty years. Calhoun is the only county in the state which had more than 500,000 trees of bearing age in 1940; whereas in 1900 there were four such counties, all in the Marion county area.

The zenith in number of bearing trees was reached about 1900, when, according to the 12th U. S. Census Report, there were 13,430,006 such trees. The lowest number in the past fifty years was recorded in 1940, when there were only 2,397,749 trees (Table 1).

In 1900, 44 counties had more than 100,000 trees each (Fig. 2). Both number of trees and number of counties having more than 100,000 trees almost doubled in the ten years from 1890 to 1900.

In the Marion county area, tree numbers decreased rapidly after 1910. By 1930 there were only about one-tenth as many trees in this area as in 1900, and there was still further decline by 1940.

The Union county area reached its low point in tree numbers in 1920; but as a result of new plantings about that time, bearing trees

TABLE 1.—NUMBERS OF APPLE TREES IN 16 PREDOMINATING COUNTIES IN THE THREE ILLINOIS COMMERCIAL AREAS, 1890-1940

Area and county	1890	1900	1910	1920	1930	1940
Marion county area						
Marion	168 785	795 188	622 234	269 998	116 216	85 744
Clay	109 454	751 727	445 859	186 577	55 341	16 868
Richland	99 237	258 418	388 125	128 887	57 037	7 670
Wayne	139 044	604 215	278 942	100 434	14 964	10 508
Jefferson	117 770	533 027	379 750	94 742	47 862	48 967
Washington	86 853	226 835	163 392	57 893	37 419	26 656
Total	721 143	3 229 410	2 278 302	838 531	328 839	196 413
Union county area						
Union	152 362	305 557	203 496	119 826	267 840	155 516
Jackson	122 714	282 051	127 732	76 515	127 170	121 009
Johnson	76 066	163 411	122 711	120 421	232 886	198 205
Williamson	142 119	333 655	159 047	78 580	105 753	61 102
Pulaski	42 577	103 486	44 605	12 786	34 437	22 384
Total	535 848	1 188 160	657 591	518 128	798 086	558 216
Western Illinois area						
Calhoun	126 953	336 734	348 888	294 920	600 360	513 828
Pike	108 030	217 746	227 296	148 916	158 243	94 415
Adams	131 560	216 896	232 543	128 499	86 821	59 858
Jersey	54 693	72 509	83 528	52 002	113 577	105 345
Greene	52 077	112 631	103 089	61 222	81 171	20 531
Total	473 313	956 516	995 344	685 759	1 040 172	793 977
Total for 16 counties	1 730 304	5 374 086	3 931 237	2 042 418	2 167 097	1 548 606
Total for Illinois	6 949 336	13 430 006	9 900 627	5 113 063	3 718 007	2 397 749

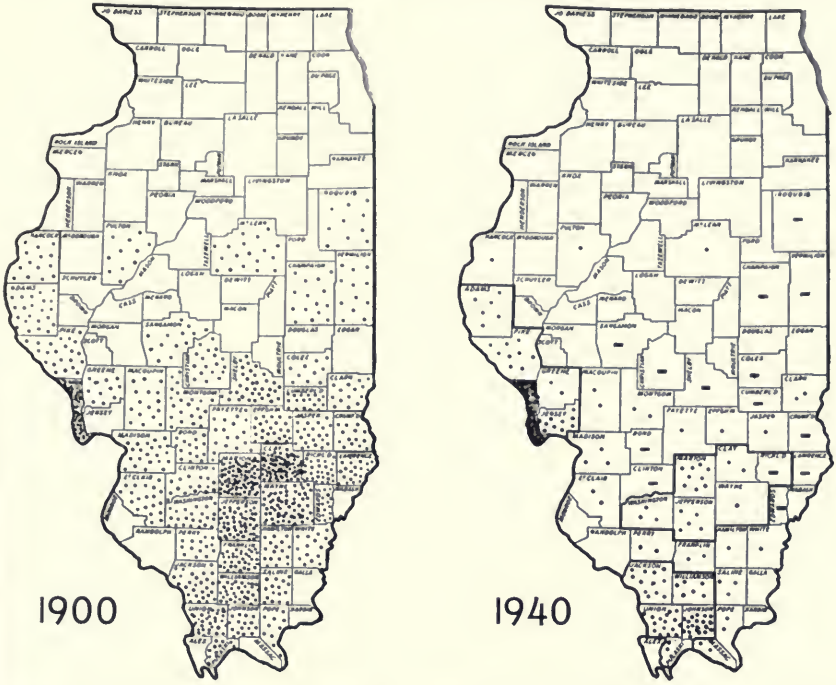

Fig. 2.—Important Illinois apple counties. *Left:* in 1900. *Right:* same counties in 1940 plus Jersey and Massac. The outstanding importance of the Marion county area in 1900 and the great increase in the relative importance of the western area by 1940 are clearly shown. (Each dot represents 10,000 trees of bearing age; the bar indicates less than 10,000 trees. In the 1900 map only counties with more than 100,000 trees are marked.)

had increased by 1930 to nearly 800,000. In 1940 there were more bearing trees than in 1920 but less than half as many as in 1900.

Unlike the other areas, the western Illinois area had more bearing trees in 1930 than in 1900, owing especially to the development of the apple industry in Calhoun county. In 1940 there were approximately 83 percent as many as in 1900.

A much larger proportion of the apple trees in the state were in the commercial producing areas in 1940 than in 1900. In the three Census years 1900, 1910, and 1920, the proportion of the state's bearing trees in the 16 counties named in Table 1 remained at approximately 40 percent of the total in the state. In 1930 the percentage had increased to 58 and in 1940 to 64.

All the counties listed in Table 1 except Wayne and Washington were designated by the U. S. Department of Agriculture in 1940 as "commercial apple counties," as were also Pope, Massac, and Macoupin

counties. In making these designations, consideration was given to many factors besides the number of trees of bearing age.

Many Illinois counties other than those listed in Table 1 produce apples for market. Many of them really constitute extensions of the three commercial areas; others are in somewhat isolated locations and principally supply local markets. Several counties having more than 100,000 trees in 1900 have never been commercially important because many of their trees were in small orchards on general farms and were not maintained for market purposes.

Carlot Shipments

For the years 1924, 1925, and 1926, before long-distance truck movement had become much of a factor in the marketing of Illinois apples, the combined carlot shipments of apples from the 16 counties listed in Table 1 constituted 82, 81, and 88 percent respectively of the carlot shipments (including carlot equivalents by boat) from the entire state (Table 2). Undoubtedly these figures represent a fairly true picture of the relative quantities marketed from these counties and from the rest of the state. Carlot shipments in recent years are of course a much less reliable measure of the relative movement of apples from different areas than they were before long-distance truck movement became important.

TABLE 2.—CARLOT SHIPMENTS OF APPLES FROM 16 COUNTIES IN THE THREE ILLINOIS COMMERCIAL AREAS, 1924, 1925, 1926

Area and county[a]	1924	1925	1926
	cars	*cars*	*cars*
Marion county area			
Marion	154	319	195
Clay	151	153	119
Richland	146	234	101
Wayne	7	12	...
Jefferson	2	14	4
Washington	20	40	16
Total	484	772	435
Union county area			
Union	375	346	622
Jackson	99	71	141
Johnson	157	369	191
Williamson	11	21	16
Pulaski	...	...	...
Total	642	807	970
Western Illinois area			
Calhoun	1 187[b]	1 248[b]	1 365[b]
Pike	1 165	891	969
Adams	446	218	325
Jersey	190	320	253
Greene	702	1 207	948
Total	3 690	3 884	3 860
Total for 16 counties	4 816	5 465	5 265
Total for Illinois	5 830	6 708	5 965
Percent from 16 counties	82	81	88

[a]Some shipments were made from stations outside the county where the apples were produced, but within the same commercial area. [b]Includes boat shipments calculated to carlot equivalents.

Total Production

Even on the basis of total production, including that from all farm orchards as well as all commercial orchards in the state, these 16 counties in 1939 produced 73[1] percent of the state's crop. Furthermore the predominance of the western Illinois area is indicated by the fact that it was credited with producing 49[1] percent of the total apple crop of the state in 1939 (Table 3).

TABLE 3.—TOTAL PRODUCTION OF APPLES IN 16 COUNTIES IN THE THREE ILLINOIS COMMERCIAL AREAS, 1939[a]

Area and county	Number of 1,000 bushels	Percent of state crop
Marion county area		
Marion	162	3.47
Clay	29	.62
Richland	30	.64
Wayne	11	.23
Jefferson	97	2.07
Washington	33	.70
Total	362	7.76
Union county area		
Union	274	5.87
Jackson	126	2.70
Johnson	264	5.66
Williamson	67	1.43
Pulaski	20	.42
Total	751	16.09
Western Illinois area		
Calhoun	893	19.14
Pike	647	13.86
Adams	335	7.18
Jersey	300	6.43
Greene	104	2.23
Total	2 279	48.84
Total for 16 counties	3 392	72.71
Total for Illinois	4 665	100

[a]From U. S. Census Report for 1940.

Predominating Varieties

In different areas the predominating varieties differ. In the Union county area early varieties dominate the apple industry, with Yellow Transparent as the outstanding single variety and Winesap as the most important late variety. In the Marion county area the Jonathan is by far the most important variety, with Rome in second place. Among the early varieties Duchess outranks Yellow Transparent.

In the western Illinois area, also, Jonathan is the most important variety. However, this region is the only area in the state where the Willow is important; so that variety is often considered its most characteristic variety. Delicious, altho grown in all three regions, is probably best adapted to the western Illinois area, where it usually develops better color. Golden Delicious is increasing in importance thruout the state while Grimes is on the decline.

It is worthy of note that six varieties made up 85.3 percent of the total number of trees in the Union county area in 1938; seven varieties, 82.2 percent in the Marion county area; and seven varieties, 84.1 percent in the western Illinois area in 1936 (Table 4).

[1]Calculated from data in U. S. Census Report for 1940.

TABLE 4.—PERCENTAGES OF APPLE TREES OF DIFFERENT VARIETIES IN EACH OF THE THREE ILLINOIS COMMERCIAL AREAS[a]
(Trees of all ages are included)

Variety	Union county area 1938 (172 growers)	Marion county area 1938 (24 growers)	Western Illinois area 1936 (313 growers)	All three areas
Early	*perct.*	*perct.*	*perct.*	*perct.*
Yellow Transparent	36.7	7.9	2.1	12.5
Duchess	5.1	11.5	2.1	3.3
South Carolina Summer	3.2	....	....	.9
Wealthy	1.3	.8	4.1	3.2
Other	2.1	.1	.6	1.0
Total	48.4	20.3	8.9	20.9
Late				
Jonathan	4.7	24.4	26.2	19.8
Grimes	1.7	3.6	6.8	5.2
Delicious	10.8	11.3	10.0	10.3
Golden Delicious	5.6	8.8	8.5	7.7
Rome	.3	14.2	2.1	1.9
King David	....	....	1.1	.7
Kinnard	1.6	[b]	....	.5
Winesap	22.4	4.1	8.4	12.4
Stayman	1.2	.9	1.1	1.1
Willow	....	....	17.0	11.4
Ben Davis[c] and Gano	1.1	2.6	7.2	5.2
York	.5	4.2	1.2	1.1
Turley	.5	4.0	....	.3
Black Twig	....	....	1.5	1.1
Other	1.2	1.6	[d]	.4
Total	51.6	79.7	91.1	79.1

[a]The data given here are based on tree surveys recorded in (1) Miscellaneous Report No. 13, Farm Credit Administration, p. 8, 1937; and (2) "The Southern Illinois Tree Fruit Industry," p. 18 (mimeo.), Ill. Agr. Exp. Sta., 1939. [b]Less than .1 percent. [c]Altho at one time more than a third of the apple trees in Illinois were of the Ben Davis variety, which was grown in all areas, this variety is now relatively unimportant. [d]Miscellaneous late varieties of minor importance are not included in the western Illinois data.

The tendency in commercial apple regions is toward fewer varieties and those of better quality or with special adaptations to particular uses. The latest recommendations of the Illinois State Horticultural Society[1] for commercial planting include only six varieties for the Union county area, nine for the Marion county area, and eight for western Illinois. Rome and Stayman, not yet important in western Illinois, are likely to become so in view of the relatively high percentage of young trees and the recommendation for additional plantings. It is significant that in each of the three areas three varieties (Jonathan, Delicious, and Golden Delicious) are among the first five in point of tree numbers.

In a survey made in fifteen Illinois counties in the fall of 1939, the actual number of bushels of each variety of apples sold that year was reported by each of the 154 growers interviewed and by the managers of two organizations. Thirty-three different varieties were reported, including many of minor importance, but seven varieties—Jonathan, Yellow Transparent, Golden Delicious, Willow, Delicious, Winesap,

[1]Ill. State Hort. Soc. Trans. **76**, 36-37. 1942.

TABLE 5.—RELATIVE IMPORTANCE OF APPLE VARIETIES AS SHOWN BY ACTUAL SALES OF 154 GROWERS AND TWO ORGANIZATIONS IN 1939

Variety	Total quantity sold	All three areas	Western Illinois (4 counties)[a]	Two Southern Illinois areas (11 counties)[a]
	bu.	*perct.*	*perct.*	*perct.*
Jonathan	148 641	21.7	31.6	12.6
Yellow Transparent	133 487	19.5	.5	36.7
Golden Delicious	70 153	10.2	10.5	10.0
Willow	60 811	8.9	18.6	....
Delicious	55 223	8.1	13.8	2.8
Winesap	47 172	6.9	2.6	10.7
Grimes	39 332	5.7	8.0	3.6
Seven varieties	(554 819)	(81.0)	(85.6)	(76.4)
Ben Davis and Gano	23 000	3.4	4.6	2.2
Rome	22 775	3.3	.8	5.6
Duchess	18 103	2.6	.2	4.8
South Carolina Summer	12 354	1.8	....	3.5
Champion	11 840	1.7	3.6	....
King David	8 570	1.3	2.2	.3
Wealthy	7 770	1.1	.5	1.7
York	7 508	1.1	.3	1.8
Stayman	3 481	.5	.4	.6
Kinnard	3 165	.4	....	.9
Wilson Red June	2 563	.4	....	.7
Senator	2 025	.3	.6	....
Williams Red	1 721	.2	....	.5
Baird	1 500	.2	.5	....
Paragon	1 496	.2	.5	....
Early Ripe	1 053	.1	....	.3
Black Twig	897	.1	.2	.1
Turley	419	.1	....	.1
Golden Sweet	315	.1	....	.1
Early Pennock	277	.1	....	.1
Winter Banana	264	(b)	....	.1
Benoni	225	(b)	....	.1
Maiden Blush	169	(b)	....	.1
Cortland	121	(b)	....	....
Ingram	93	(b)	....	....
Minkler	82	(b)	....	....
Total, all varieties	686 605	100	100	100

[a]See Table 12, page 521, for names of counties. [b]Less than .1 percent.

and Grimes—made up 81 percent of the total volume of apples sold (Table 5). The relative importance of each of these seven varieties in western Illinois and in southern Illinois is also clearly shown.

These figures on actual sales show that the quantities of most varieties sold were largely proportionate to number of trees (Table 4) even tho the relative yields of different varieties vary from year to year.

Organization of Fruit Farms

Commercial orcharding in Illinois tends to be a specialized business, tho in some areas and by some operators it may be handled as part of a general farming enterprise.

Western Illinois area. Calhoun county contains the most concentrated apple-producing area in the state. In the 1936 survey 674 apple growers in this county were classified as commercial orchardists. Their holdings varied from 4 acres to 500. Usually the orchard was the chief source of income from these farms. More than half the cropland

TABLE 6.—DISTRIBUTION OF VEGETABLE AND SMALL-FRUIT PRODUCTION ON FRUIT FARMS ACCORDING TO COUNTIES, UNION COUNTY AREA, 1938[a]

County	Number of farms	Farms growing vegetables		Farms growing small fruits	
		Percent	Acres per farm where grown	Percent	Acres per farm where grown
Union	100	68.0	5.9	38.0	3.6
Johnson	18	5.6	4.0	5.6	2.7
Jackson	33	30.3	4.5	24.2	2.1
Pulaski	22	72.7	6.2	68.2	6.2
Total and average	173	54.9	5.8	37.6	3.9

[a]Based only on records which were complete enough for this analysis.

was occupied by orchards, the balance being used principally to grow feed for the work animals and for a few cows and hogs. More than half the growers had less than 20 acres of orchard each. Of the remaining orchardists in the county, 159 had 21 to 40 acres in orchard, 104 had 41 to 80 acres, and 34 had more than 80 acres.

In the other counties of the western Illinois area there are fewer small orchards and the orchard enterprise is usually operated along with cattle feeding, hog production, or general farming. In a few instances large acreages have been taken over and operated by persons or companies with capital from other sources.

Union county area. Vegetables for market as well as orchard fruits were grown on 55 percent of the fruit farms in this area in 1938 and small fruits on 38 percent (Table 6). The average number of acres of vegetables was 6, and of small fruits, 4. Strawberries and raspberries were the principal small fruits grown. Predominant vegetables were asparagus, string beans, sweet potatoes, and tomatoes. Other crops were as indicated in Table 7.

TABLE 7.—VEGETABLE CROPS GROWN ON 173[a] FRUIT FARMS IN UNION COUNTY AREA, 1938

Crop	Farms where designated crops were grown		Average acres per farm where grown
	Number	Percent	
Asparagus	22	12.7	5.0
Beans, string	36	20.8	2.9
Muskmelons	25	14.5	2.1
Cucumbers	25	14.5	1.2
Peppers	8	4.6	.6
Potatoes	14	8.1	1.3
Rhubarb	4	2.3	1.3
Squash	5	2.9	.9
Sweet potatoes	47	27.2	2.6
Spinach	5	2.9	2.5
Tomatoes	42	24.3	1.9
Miscellaneous	8	4.6	.9

[a]One hundred farms were in Union county, 22 in Pulaski county, 33 in Jackson county, and 18 in Johnson county.

A large proportion of the orchardists in the Union county area grew both peaches and apples in 1938, the average number of apple trees per farm being 1,672 and of peach trees, 2,232. Feed for work stock was produced on some of the farms, but very few of the 173 growers interviewed reported dairy cows, other livestock, or general crops as important sources of income. Vegetables and small fruits were grown mostly on the farms having only 500 to 1,500 fruit trees each. These products were grown most extensively in Union and Pulaski counties and were of least importance in Johnson county (Table 6).

In years of fruit failure in this area it is the custom of many growers to increase their acreages of vegetables in order to offset some of the loss of the fruit crop. Thus, with a diversity of both fruits and vegetables, they are less dependent upon their apples as a source of income than are the small growers in other parts of the state.

Marion county area. In this area many of the apple growers produce peaches also, and in one locality (Alma) Kieffer pears are an important crop. On some farms a large percentage of the cropland is devoted to tree fruits, while on others the orchard enterprise is carried on in conjunction with general farming.

Very few vegetables are commercially grown in this area, and it is not customary for orchardists to try to supplement their income by planting vegetables in years of fruit failure. Small fruits, likewise, are now of little commercial importance in this area, tho some years ago strawberries were quite prominent at certain shipping points.

DEVELOPMENT OF GRADING AND PACKING FACILITIES

Modern packing sheds equipped with up-to-date machinery for washing, grading, and packing apples for market are now in general use in Illinois. However, for many years after apple production became a prominent industry in this state, the packing took place in the orchard, with no protection provided for the workers or the fruit from sun or rain. The pickers poured the fruit from their sacks onto a portable sorting table. Four rows of trees were picked at a time, and the table was moved after each group of 16 trees had been picked (Fig. 3).

Introduction of Shed Packing

A few orchardists introduced shed packing about 1903, but a sorting table similar to the portable orchard table was still used. At the annual meeting of the Horticultural Society of Southern Illinois in

Fig. 3.—Earlier method of packing apples. Before sheds were introduced, orchard packing prevailed thruout the state.

1904, W. S. Perrine made the statement that apples could be "packed just as cheaply and a good deal better" in a properly constructed and arranged shed than in the orchard.[1] In the discussion following Mr. Perrine's paper, R. A. Simpson, who had used shed packing for two years, and A. V. Schermerhorn reported that they had found shed packing more economical than orchard packing.

Within a few years most of the prominent orchardists in the Marion county and Union county areas were using sheds for packing their fruit (Fig. 4), but orchard packing was still the prevailing practice in Calhoun county as late as 1927, when only three small sheds were used in the entire county.[2]

In orchard packing and in the early days of shed packing, hand sorting and sizing were employed. Sometimes each sorter was furnished with a metal ring to check his judgment on size of fruit. If only one grade of apples was being packed, the fruit might be passed over a tilted "running table"; if two or more grades were being packed, the fruits were picked up from the sorting table by hand and placed in baskets. Mechanical sizing machines, equipped with sorting belts, were introduced into Illinois about 1915. Several growers were using them by 1922; and in the late twenties their use became quite general.

[1]Ill. State Hort. Soc. Trans. **38**, 479-481. 1904.
[2]Ill. Agr. Exp. Sta. Bul. 312, p. 564. 1928.

Fig. 4.—Modern Illinois fruit-packing shed. Sheds of this type, equipped with mechanical sizing machinery and fruit washers for removal of spray residue, are common thruout the commercial apple areas of the state.

Equipment for Spray-Residue Removal

Some Illinois apples packed in the fall of 1941 failed to meet the required spray-residue tolerance and were attached by U. S. Government officials after the apples had been sent across the state border. The required reconditioning of such fruit after it had passed out of the producing area was very expensive to the owners. Illinois growers had been afforded the service of spray-residue laboratories maintained in the producing areas by the Illinois State Department of Agriculture from 1935 to 1940 inclusive, where arsenic and lead determinations were made on apple samples for a nominal fee at the request of the growers. Since very little use of this service was made in 1940 following a change in the tolerance requirements, the service was dropped in 1941; but at the urgent request of growers it was renewed in 1942 and was very extensively patronized.

Spray-Residue Restrictions

The removal of spray residue has been a problem in Illinois since 1932, when the federal tolerance was reduced from .025 grain of arsenic per pound of fruit to .01 grain. In the spring of 1933 a tolerance for lead was established at .025 grain per pound and later reduced in successive rulings until it reached .018 grain in 1935. The Illinois State Horticultural Society passed a resolution at its annual meeting in November, 1935, urging the Illinois State Department of Agriculture to adopt and enforce spray-residue tolerances on apples

sold in Illinois in conformity with the federal spray-residue regulations, and also urging Illinois growers to meet these regulations by the use of proper spray programs and spray-residue removal.[1]

These tolerances were made applicable to intrastate shipments of Illinois apples beginning with the season of 1936, by action of the Illinois State Department of Agriculture. Previous to this action many Illinois growers had radically revised their spray schedules, others had installed fruit washers in their packing sheds, and still others had done both. It is reported that the first washers installed in the state were put into operation about 1929. A large number were built or purchased in 1932, when the federal tolerance on arsenic was placed at .01 grain per pound of fruit, and others when the lead tolerance was introduced and lowered.

Commercial packing and cooperative packing were somewhat stimulated by the lowering of the tolerances and their application to intrastate as well as interstate shipments, since many growers were not in a position to provide themselves with fruit-washing equipment.

Following the restoration of the lead-residue tolerance to .025 grain per pound of fruit in 1938, and particularly following the raising of the lead tolerance to .05 grain and the arsenic tolerance to .025 grain in August, 1940, many growers and packers relaxed their vigilance—some ceased to operate their washers and others used weaker solutions, omitted the silicate, or no longer heated the water. This relaxation culminated in 1941, and in 1942 a renewal of strict attention to all details of spray-residue removal took place.

CHANGES IN TYPE OF PACKAGE

The tub bushel is today recognized as the standard Illinois apple package for shipment, storage, and resale. Box packing has never taken a real foothold in Illinois, and the transition from the barrel to the bushel basket was easy, especially after the tub type of bushel basket had been given a fair trial as a storage container. It is sturdy enough to withstand repeated use if necessary, and thus meets emergency wartime requirements when a concerted effort is being made to conserve fruit packages by assembling used containers in the consuming areas and returning them to the producing regions.

Illinois is in that part of the country formerly known as the "barrel-apple area" as contrasted with the "box-apple area," the barrel having been recognized as the standard package for apples in this state from the beginning of commercial apple culture until after the close of the first World War. Early shipments of summer apples from the Union county area, however, were sometimes made in climax baskets, which

[1]Ill. State Hort. Soc. Trans. **69**, 273. 1935.

were loaded in mixed cars with muskmelons, cucumbers, and string beans packed in the same type of package. Occasional shipments of summer apples were also made in bushel baskets, but the principal movement of summer varieties, as well as fall and winter varieties, was in barrels. For shipments during warm weather the barrels were ventilated by holes bored thru a few of the staves with an auger or chopped with a barrel hatchet.

At a later period bushel baskets came into somewhat general use for straight carlot shipments of summer apples and even for fall and early winter varieties when they were to be marketed for immediate consumption. The bushel basket was not considered a suitable package for winter storage, and all apples intended for cold storage were packed in barrels. The shift from the use of barrels to that of bushel baskets wherever feasible was greatly stimulated about 1920, when three baskets could be bought for considerably less than one barrel.

Adoption of Tub Bushel

The tub type of bushel basket, introduced about 1925, offered greater strength and rigidity than the round-bottom basket and consequently cold-storage operators accepted Illinois apples in bushel containers without unduly penalizing the owners by charging excessive storage rates (Fig. 5). In fact in the fall of 1927 a differential of

Fig. 5.—Two types of bushel containers for apples. The "tub bushel" (*right*) has largely superseded the round-bottom bushel basket (*left*) as a shipping and storage container for Illinois apples.

10 cents a bushel in the season rate was made by certain storage firms in favor of apples packed in tub bushels compared with those in round-bottom baskets.[1] High stacking of round-bottom baskets in storage had sometimes resulted in severe crushing of the fruit in the baskets near the floor and made storage men wary of this type of package. Hence they discouraged its use.

[1]Ill. Agr. Exp. Sta. Bul. 312, p. 571. 1928.

By 1927 the bushel basket had largely displaced the barrel as a shipping and storage package in all Illinois apple-producing regions except Calhoun county, and that year 55 percent of the Calhoun county crop was shipped in baskets. The transition is now complete, and not a packing shed in the whole state is arranged for barrel packing. Cooperage shops have entirely disappeared from the apple regions, and an apple barrel is practically a museum specimen.

Attempts to Introduce Box Packing

Attempts have been made from time to time to introduce box packing of apples in Illinois. As early as 1903 tests of the packing and marketing of Illinois apples in bushel boxes[1] were made by the Illinois Station, and in 1909 at the meeting of the Illinois State Horticultural Society a demonstration in box packing was staged by a man from the Pacific Coast. At that time, box packing did not appeal to Illinois growers, nor did the Illinois product in western-type boxes appeal to the trade.

Some years later a few Illinois growers undertook to use the western box for part of their fruit. Two growers in Calhoun county were using this package in 1927,[2] and one in particular had worked up a special trade in St. Louis for fancy Winesaps in this type of package. The fruit was rigidly sized and was packed according to numerical count. Each apple was wrapped in oiled tissue like the best western packs, and the boxes bore lithographed labels. Such refinements do not seem to have been adopted by other Illinois growers.

About 1932 a prominent apple dealer in Chicago, who also had extensive orchard interests, began packing part of his product in what was designated as the "gift box." This was a box of one-bushel capacity but different in shape from the standard western box. It was paper-lined, jumble-packed, and had three slats across the top instead of a solid lid. A few other growers and packers have used this package to some extent, but it has not been adopted generally as an Illinois fruit package and is now used less than it was five years ago.

DEVELOPMENT IN GRADING STANDARDS AND THEIR USE

The latest revision of the Illinois standard apple grades was made in the spring of 1943, effective May 15. The Illinois-U. S. Fancy, Illinois-U. S. No. 1, Illinois-U. S. Utility, Illinois Combination, and Illinois No. 1 Pie grades were retained with specifications unchanged.

[1]Ill. State Hort. Soc. Trans. **37**, 143-161. 1903.
[2]Ill. Agr. Exp. Sta. Bul. 312, p. 572. 1928.

In addition, a new grade, Illinois Domestic, was provided in order to facilitate the sale of superior-quality dropped apples.[1]

The first attempt to establish a definite standard for grading apples in the United States was a resolution adopted by the National Apple Shippers Association, August 2, 1895, defining No. 1 apples. In the specifications special emphasis was placed upon the size of the fruit and the stipulation that it must be hand picked, tho reference was also made to insect injuries and other blemishes as well as color and form. These specifications were used by members of the National Apple Shippers Association in many contracts. In 1900 the same association adopted specifications for No. 2 apples.

As early as 1903 the Illinois State Horticultural Society recognized the importance of standardization of apple grades, and at the annual meeting of the Society that year resolutions were passed defining No. 1 and No. 2 apples.[2] The grading specifications were not materially different from those adopted before by the National Apple Shippers Association. However, the use of these grade specifications was optional, and there was little uniformity in grading Illinois apples.

Early Attempts at Federal Legislation

Attempts were made at national legislation in reference to apple grades in 1907 and again in 1909, but the difficulty of harmonizing the interests of growers in the barrel-apple regions of the East and in the box-apple regions of the West prevented the passage of either bill. The next attempt at standardization of apple grades by a federal law was therefore confined to apples packed in barrels. "An Act to establish a standard barrel and standard grades for apples when packed in barrels, and for other purposes,"[3] passed in 1912, becoming effective July 1, 1913, specified the U. S. "Standard Grade" in three sizes. It was not mandatory and had very little effect upon the grading of apples in Illinois or in other states.

Adoption of Official Grades for Illinois

Soon after the passage of the above law several states adopted apple-grading and packing laws of their own, and by the end of 1920 there were such laws in nineteen states.[4] Following the example of these states Illinois passed an apple-grading law in June, 1921, effec-

[1] A pamphlet fully describing the present Illinois apple grades can be procured from the Division of Markets, Illinois State Department of Agriculture, Springfield.

[2] Ill. State Hort. Soc. Trans. **37**, 21. 1903.

[3] This act was based on the so-called "Sulzer Bill," and is usually referred to as such. Same **46**, 152-165. 1912.

[4] Same **54**, 85-100. 1920.

tive September 1 of the same year. This law was amended in June, 1923, exempting from its provisions apples packed and branded in accordance with apple-grading specifications recommended by the U. S. Department of Agriculture and promulgated after the federal law passed in 1912 had failed to improve grading and packing.

In 1923 an Illinois inspection and standardization law was passed which might be made applicable to any or all agricultural products at the discretion of the State Director of Agriculture. The director was "authorized, after investigation and public hearing, to fix and promulgate official standards for grading and classifying any or all agricultural products grown or produced in this state." Hearings were held in the summer of 1923 at Carbondale, Centralia, and Quincy in reference to establishing standards for Illinois apples and peaches. Sentiment at the hearings was in favor of adopting the U. S. grade specifications for these two commodities. Following the hearings the Director of Agriculture announced that the U. S. grades for apples and peaches had been adopted as the official grades for Illinois.

Shipping-point inspection was put into operation in Illinois that season (1923) on peaches and late apples, on the basis of these grades. The apple specifications were those that had been announced by the U. S. Department of Agriculture as of April 25, 1923. Provision was made for four grades: U. S. Fancy, U. S. No. 1, U. S. No. 2, and U. S. No. 3. Color requirements for the Fancy and No. 1 grades in each important variety were specified on a percentage basis.

Revisions of Grade Designations and Specifications

Revisions of the Illinois apple grades were made following a public hearing in the summer of 1929, and the revised standards were made effective as of August 1, 1929. Following changes in grade designations announced by the U. S. Department of Agriculture, the word "Utility" was introduced to designate the grade of apples previously known as "No. 2," and the word "Unclassified," to designate apples previously called "No. 3." In addition to the Illinois-U. S. Fancy, Illinois-U. S. No. 1, Illinois-U. S. Utility, and the Unclassified, two new grades for Illinois apples were introduced: Illinois Orchard Run and Illinois No. 1 Summer.

Again in April, 1932, the Illinois grade designations and specifications were revised after public hearings. These grades were based upon the "Official Standards for Apples" issued by the U. S. Department of Agriculture in August, 1931, but differed from the U. S. grades in certain particulars.

Further revisions of the Illinois grade specifications for apples were made after a hearing in Springfield in the spring of 1937 and became effective May 15 of that year. The principal changes were the

substitution of the Combination grade (Illinois-U. S. No. 1 and Illinois-U. S. Utility) for the Illinois Orchard Run, and the introduction of the new grade designated as "Illinois No. 1 Pie Apples." The Combination grade differed from the former Illinois Orchard Run in that a minimum of 50 percent instead of 40 percent of the apples in the Combination must meet the requirements of the Illinois-U. S. No. 1 grade.

The Illinois "Pie" grade is unique and was made to meet the special requirements of the pie industry of Chicago and St. Louis, which depends primarily upon western Illinois apples to supply its needs. There is no color requirement for this grade, even tho the Willow (a striped variety) is most commonly used. The most important specification for this grade is that the fruit must be free from "any defect which cannot be removed during the usual commercial preparation for use without causing a loss of over 5 percent, by weight, of the apple in excess of that which would occur if the apple were perfect." Surface blemishes, particularly scab spots, are considered inconsequential. In packing this grade it is the common practice to dispense with facing, pads, and liners to save expense. Furthermore, *used* packages are usually furnished by the buyer under the terms of sale and purchase of this type of apple. These economies in packing are made even tho the fruit is to be placed in cold storage for use late in the spring.

Lag in General Use of Official Grades

Altho shipping-point inspection was made available to Illinois shippers of both apples and peaches in 1923, most of the requests for inspection were from peach shippers. As a result, packing apples according to the established Illinois grades came into general practice more slowly than packing peaches in this way. Grading and designation of apple grades according to the personal ideas of the packer continued to be quite common for several years after the establishment of official Illinois grades and provision for inspection service.

Shipping-point inspection of apples first reached Calhoun county in the fall of 1927. Eighty-seven carloads, representing 247 lots, were inspected by the State Department of Agriculture as offered for shipment. The inspectors' reports on these carloads indicate that wherever a recognized standard grade designation was marked on the package, a sincere attempt had usually been made to grade the fruit according to the specifications for the proper grade. However, half the lots were not marked with official grade designations, and many of these were below the No. 2 grade.

The wide variety of markings on the packages indicated that the packers were not yet familiar with the official grade designations. Markings ranged all the way from "U. S. Fancy" to no mark at all.

Of the 25 lots marked "U. S. Fancy" or "Fancy," all except one actually graded U. S. Fancy. Of the 87 lots marked "U. S. No. 1" or "No. 1," 75 graded U. S. No. 1. Twelve lots were marked No. 2; all except one of these graded U. S. No. 2. The other 123 lots, or practically half of the total, were not marked according to any official grade designation.[1]

Grading and packing demonstrations conducted in Calhoun county by the University of Illinois Agricultural Extension Service in 1928 greatly stimulated more intelligent packing and marking of apples in that county.

Standardization Act

All Illinois products for which grade designations and specifications have been announced by the Director of Agriculture come under the provisions of the Standardization Act, a law passed by the Illinois legislature in 1923 and revised from time to time, providing for the promulgation of grade standards for Illinois products and for inspection of them at shipping points. Such inspections are made upon the request of the shipper or some other party having a financial interest in the shipment; and as a result of every such inspection, a certificate is issued showing the exact grade and condition of the contents of the car, including percentage of each kind of defect.

The extent to which Illinois apple growers and shippers have availed themselves of the shipping-point inspection service during the past eleven years is indicated by the number of carloads or carlot equivalents inspected. These were as follows:

Year	*Number of cars*	*Year*	*Number of cars*	*Year*	*Number of cars*
1933	82	1937	218	1941	304
1934	122	1938	638	1942	465
1935	156	1939	244	1943	528
1936	637	1940	342		

(Figures are for years ending June 30. Data obtained mainly from Twenty-Fifth Annual Report of the Illinois State Department of Agriculture, 1942, p. 121.)

Number of cars inspected depended largely on size of crop, the largest number, 638, being for the year ended June 30, 1938.

Besides the shipping-point inspection made for purposes of certification at the owner's or shipper's request, the State Department of Agriculture makes many inspections of its own to enforce the "closed package" section of the Standardization Act in reference to grading, packing, and branding of fruits and vegetables. Severe penalties are now provided for infractions of this law, which is very definite as to the grading, packing, and marking of packaged apples.

[1]Ill. Agr. Exp. Sta. Bul. 312, p. 570. 1928.

Percentages of Different Grades

The percentage of the crop meeting the requirements of the U. S. No. 1 grade and the percentage handled under each of the other grade designations vary widely from year to year and from orchard to orchard. According to the estimates of 313 western Illinois apple growers interviewed, their crops in 1935 averaged a little over 50 percent U. S. No. 1, tho the packout at commercial sheds averaged only about 45 percent No. 1.[1]

Detailed records procured from growers in western Illinois in 1937, 1939, and 1941, and in southern Illinois in 1938 and 1939 supplied the data summarized in Table 8, indicating the percentages of each grade of apples marketed by these representative growers in the crop years concerned. The larger percentages of No. 1 fruit from southern Illinois are undoubtedly due in part to the fact that the percentages are figured on the basis of the fruit actually sold. Sales from western Illinois included considerable cider stock, while in southern Illinois there are few cider mills, and much cider stock sometimes is wasted and is not included in the calculation of percentages of the different grades.

TABLE 8.—PERCENTAGE OF DIFFERENT GRADES OF APPLES MARKETED BY GROWERS IN WESTERN AND SOUTHERN ILLINOIS, 1937, 1938, 1939, 1941

Area and year	Number of growers	Bushels	Percentage of apples marketed as—					
			U. S. No. 1	Utility	Combination	Pie	Unclassified	Cider
Western								
1937	114	604 083	42.6	3.4	3.4	4.5	30.8	15.3
1939	33[a]	373 957	27.0	4.0	1.0	4.0	46.0	18.0
1941	42	225 914[b]	24.3	1.7	2.6	3.0	47.4[c]	21.0
Southern								
1938	164	168 678	58.6	5.5	5.1	...	30.8	....
1939	123	207 007	40.0	3.0	1.0	...	53.0	3.0

[a]Includes 31 growers and 2 organizations. [b]Includes apples stored. [c]Includes 9.6 percent tree-run sold largely to wholesale dealers operating packing sheds.

The figures in Table 8 include both packaged and bulk fruit, and do not give an accurate idea of the grading of Illinois packaged apples. Most of the *early* apples are sold in packages, rather than in bulk. Of the *late* apples, however, only 41 percent were sold in packages in 1939, 46 percent in bulk for consumption as fresh fruit, and 13 percent in bulk to cider mills. Data procured from growers in 1939 indicate that 94 percent of the packaged *early* apples that year were of U. S. No. 1 grade. Of the packaged *late* apples, 68 percent in western Illinois and 83 percent in southern Illinois were of U. S. No. 1 grade (Table

[1]Farm Credit Admin. Misc. Rpt. 13, p. 28. 1937.

TABLE 9.—PERCENTAGE OF DIFFERENT GRADES OF PACKAGED AND BULK APPLES OF LATE VARIETIES MARKETED BY WESTERN AND SOUTHERN ILLINOIS GROWERS, 1939 AND 1941

Grade	Packaged fruit			Bulk fruit		
	Western Illinois		Southern Illinois	Western Illinois		Southern Illinois
	1939	1941	1939	1939	1941	1939
U. S. No. 1	68	54	83	...	1	3
Utility	10	4	6	1	1	...
Combination	4	6	2	...	...	...
Pie	9	7	...	...	1	...
Unclassified	9	29	9	69	43	91
Cider	...	...	...	30	37	6
Tree run[a]	...	...	...	...	17	...
Total percent	100	100	100	100	100	100
Total bushels	144 858	99 942	96 576	229 099	125 972	110 431

[a]The tree-run fruit was sold mostly to wholesale dealers operating packing sheds and was delivered principally in field crates.

9). On the other hand, very high percentages of the bulk apples were Unclassified stock. In these records fruit sold under such local grade designations as "bulk stock," "peddler stock," "culls," "tree run," and "orchard run" were listed as Unclassified.

Of the late apples sold at harvest time from western Illinois orchards in 1941, 44 percent were sold as packed fruit, 35 percent in bulk for fresh consumption, and 21 percent to cider mills. Of the packaged fruit, 54 percent was of U. S. No. 1 grade, and 29 percent was Unclassified (Table 9). Seventeen percent of the bulk fruit was "tree run," sold largely to wholesale dealers who operated packing sheds and graded out the fruit to suit their requirements. Most of the other fruit sold in bulk was either Unclassified or cider stock. The Unclassified stock included fruit with such local designations as "orchard run," "bulk stock," and "peddler stock," as well as drops and culls. The fruit classified here as cider stock included only that sold directly to cider mills.

CHANGES IN TRANSPORTATION FACILITIES AND METHODS

The truck situation due to war conditions reduced truck operations in the movement of the western Illinois apple crop in the fall of 1942. Truckers from outside areas were much less numerous than during the immediately preceding harvest seasons. This was particularly true of merchant truckers. Whereas in 1941 these operators moved 22 percent of the western Illinois crop (Table 15, page 524), in 1942 they accounted for only 12.5 percent of that portion of the crop which moved out of the producing area by truck. Furthermore merchant

truckers of the type seeking Unclassified stock were particularly scarce. Whereas in 1941, 77 percent of the purchases made by merchant truckers in this area consisted of Unclassified stock, their purchases in 1942 contained only 53 percent. This was not due to any scarcity of Unclassified stock; operators of packing sheds reported accumulations of this type of apples.

The area of general distribution of western Illinois apples by truck in 1942 was much smaller than in 1941. Only 12 out of the 1,091 truckloads included in a truck survey made in 1942[1] were delivered to points in states other than Illinois and Missouri, and only 20 percent of the truckers other than farmers hauled apples more than 200 miles; the farm trucks operated mostly within a radius of 50 miles.

Not only were trucks more scarce than in the preceding year, but the tires on 90 percent of the commercial and the dealers' trucks operating in the area in the fall of 1942 would need replacements within 12 months, according to data assembled during the survey. This means that probably still fewer trucks will be available for handling the 1943 crop and that more dependence will have to be placed on rail transportation.

Railway and River Transportation

Illinois has for a long time been well supplied with railroad lines in all parts of the state except Calhoun county. There is not yet a railroad within that county, but an extension of the Chicago and Alton Railway to East Hardin (just across the Illinois river from Hardin) built in 1925, greatly improved the facilities for rail shipments. Until 1931, however, all apples for such shipments had to be ferried across the Illinois river on transfer barges or on trucks or wagons on the ferry boats. In 1931 communications between Calhoun county and the rest of the state were further improved by the completion of a highway bridge across the Illinois river connecting Hardin with East Hardin (Fig. 6). Several apple-packing sheds were then established in East Hardin and were served by sidetracks where cars could be loaded directly from the sheds (Fig. 7).

Previous to the extension of the railroad to East Hardin, and even for a year afterwards, river transportation was the principal means of moving apples from Calhoun county. Shipments to St. Louis, Hannibal, and Peoria normally traveled the entire distance by water. Because of its accessibility by river, St. Louis was the principal market for Calhoun county apples. In fact previous to 1927 more apples were shipped from Calhoun county by boat to St. Louis than to all other markets and by all other transportation methods.

[1]Trucking Illinois fruits and vegetables in wartime. J. W. Lloyd and R. A. Kelly. Ill. Agr. Exp. Sta. (mimeo.). February, 1943.

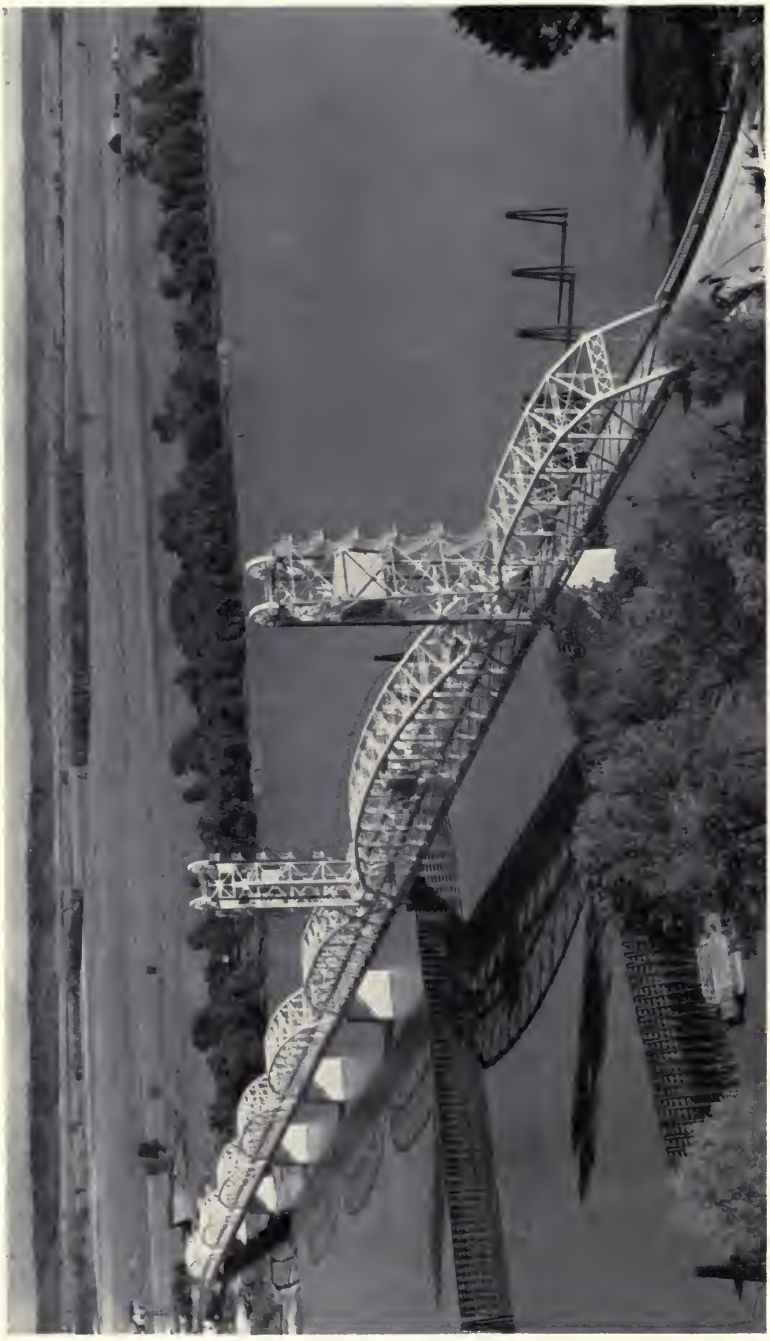

Fig. 6.—Bridge across the Illinois river at Hardin. This bridge, which is 1,746 feet long and was completed in 1931 at a cost of $670,000, greatly improved the facilities for transportation of fruit from Calhoun county to markets south and east.

Increase in Truck Shipments

By 1927 the movement of apples by truck from the southern part of Calhoun county to St. Louis via ferry at Golden Eagle had reached considerable proportions. After the close of the apple harvest in 1927 the concrete highway from East Hardin to Jerseyville was completed, thus affording hard-road connections from East Hardin to St. Louis via Jerseyville and Alton and facilitating truck movement of apples

Fig. 7.—Loading direct from packing shed to refrigerator cars. At many points in the state large packing sheds are served by railway sidetracks, so that the fruit can be placed in refrigerator cars as fast as it is packed. This shed is located in Pike county.

from the central part of the county and from along the concrete highway between Hardin and Kampsville.

Transportation by river boats almost ceased with the season of 1930, and the truck became the most important means of moving apples from Calhoun county (Table 10). In 1932 two-thirds of the crop was moved by truck. Truck movement to the east and the south was greatly facilitated by the bridge at Hardin. But there was no connection to the north and west by hard road, since there were only 12 miles of concrete highway in the county (connecting Hardin and Kampsville) at that time.

TABLE 10.—BOAT, RAIL, AND TRUCK SHIPMENTS OF APPLES FROM CALHOUN COUNTY, SHOWING PERCENTAGES MOVED BY EACH, 1927-1932

Transportation	1927	1928	1929	1930	1931	1932
	perct.	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*
By boat	30.5	25.1	8.5	1.7	....	....
By rail	38.1	47.3	35.6	42.4	39.4	29.0
By truck	22.9	13.8	40.5	49.4	47.5	66.5
Shipped as cider	8.3	13.7	15.4	6.4	13.1	4.8
Total percent	100	100	100	100	100	100
Total bushels	720 426	1 399 221	790 944	1 919 907	1 523 940	1 319 475

Extension of Hard-Road Connections

Finally in 1935 the completion of the portion of Route 100 extending north from Kampsville to Detroit in Pike county made connections for Calhoun county with the main highways leading to Hannibal, Quincy, and the markets in northern Missouri, Kansas, Nebraska, Iowa, and Minnesota. During the past few seasons these markets have been of increasing importance as outlets for apples not only from Calhoun county but also from the other counties in the western Illinois producing area. In 1939, 88 percent of the apples marketed from western Illinois were moved out by truck and 12 percent by rail. It is probable that the percentages were about the same in 1941, tho data collected on this point were insufficient to make definite calculations.

TABLE 11.—TRUCK AND RAIL SHIPMENTS OF SOUTHERN ILLINOIS APPLES TO MARKET, 1938 AND 1939[a]

Varieties	1938			1939		
	Total	Truck	Rail	Total	Truck	Rail
	bu.	*perct.*	*perct.*	*bu.*	*perct.*	*perct.*
Early	84 458	49.6	50.4	173 039	52	48
Late	71 371	95.6	4.4	189 336	95	5
All	155 829	70.7	29.3	362 375	74	26

[a]Shipments by the growers interviewed.

In other apple-producing regions of the state the improvements in the hard-road system[1] and the general increase in the use of motor trucks have resulted in increased movement of apples by truck. The percentages of the crops of early and of late varieties moved by truck and by rail from the southern Illinois producing areas in 1938 and 1939 are given in Table 11. It will be noted that 70.7 percent of the crop,

[1]The total mileage of rural high-type pavement maintained by the state increased from 7,603 miles at the end of 1929 to approximately 13,847 miles at the end of 1941. (Letter from H. E. Surman, Illinois Division of Highways, December 30, 1941.)

including both early and late varieties, moved to market by truck in 1938 and 74 percent in 1939. A much larger percentage of the early varieties moved by rail than of the late varieties. This is due to the much wider and more distant distribution of the early varieties, since they move at a time when summer apples are not available in volume from many other sources in the United States.

METHODS OF SALE

Many different methods of sale and sales outlets are employed today in the disposition of the Illinois apple crop. No fewer than ten

TABLE 12.—SALES OUTLETS EMPLOYED FOR ILLINOIS LATE APPLES AND PERCENTAGE SOLD THRU EACH, 1935-1941[a]

Outlet	1935 W. Ill.	1937 W. Ill.	1938 So. Ill.	1939 W. Ill.	1939 So. Ill.	1941 W. Ill.
	perct.	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*
Outright sale to wholesale dealers	15.2	20.1	10.0	15.1	17.9	24.6
Consignment to commission merchants	31.9	3.9	....	3.3	3.5	2.3
Sales thru brokers	[b]	9.4	9.9	6.7	11.3	22.5
Direct sales to merchant truckers	14.0	22.9	46.8	37.5	48.1	22.3
Sales to pie companies	[c]	4.6	....	....	....	....
Sales thru cooperatives	3.9	8.8	14.4	10.5	4.1	5.0
Direct sales by growers on terminal markets	15.8	1.1	....	....	....	[b]
Delivered sales to retail merchants	....	1.7	1.6	3.1	1.8	.2
Direct sales to consumers	3.8	4.7	11.1	1.5	6.5	.8
Sales to cider mills	9.4	22.0	1.6	22.2	4.5	22.3
Other outlets	2.6	.8	4.6	.1	2.3	....
Waste, not sold	3.4	....	....	....	....	....
Total percent	100	100	100	100	100	100
Total bushels	2 691 085	418 075	54 195	254 234	144 887	225 914
Number of growers furnishing data	313	114	164	33[d]	123	42

[a]Data on the 1935 crop were collected in 7 western Illinois counties (Adams, Pike, Calhoun, Jersey, Greene, Scott, and Brown), the 1937 crop in 4 of these counties (Adams, Pike, Calhoun, and Jersey); data on the 1938 crop in 7 southern Illinois counties (Union, Johnson, Pulaski, Jackson, Marion, Jefferson, and Washington). Data on the 1939 crop were collected in Adams, Pike, Calhoun, and Jersey counties in western Illinois; in Marion, Jefferson, and Washington counties in the Marion county area; and in Union, Johnson, Jackson, Pulaski, Massac, Williamson, Franklin, and Saline counties in the Union county area. Data on the 1941 crop in western Illinois were collected in Calhoun, Pike, and Jersey counties. [b]Negligible. [c]Included in outright sales to wholesale dealers. [d]Includes 31 growers and 2 organizations.

different types of sales outlets are used, according to data collected in surveys of the apple crops of 1935, 1937, 1938, 1939, and 1941 to ascertain the methods of marketing Illinois apples (Tables 12 and 13). The proportion of the crop disposed of thru each of the various outlets varied widely from year to year during 1935-1941 and also varied among the different producing areas. There has also been a difference in the handling of summer varieties as compared with fall and winter varieties.

TABLE 13.—SALES OUTLETS EMPLOYED FOR EARLY ILLINOIS APPLES AND PERCENTAGE SOLD THRU EACH, 1938 AND 1939[a]

Outlet	1938 Southern Illinois	1939 Southern Illinois	1939 Western Illinois
	perct.	*perct.*	*perct.*
Outright sale to wholesale dealers	2.7	5.3	14.0
Consignment to commission merchants	8.0	16.3	81.6
Sales thru brokers	67.3	56.7	....
Direct sales to merchant truckers	6.2	9.5	....
Sales to pie companies	....	.1	....
Sales thru cooperatives	13.4	8.8	....
Delivered sales to retail merchants	.9	1.2	4.4
Direct sales to consumers	1.2	2.0	....
Sales to cider mills	....	.1	....
Other outlets	.3	....	....
Total percent	100	100	100
Total bushels	78 315	177 686	4 309

[a]By the growers included in the survey.

Outlets for Late Apples

In 1941 more of the western Illinois late apples were disposed of by direct sale to wholesale dealers than thru any other outlet (Table 12). Slightly smaller volumes were sold directly to merchant truckers. These two outlets accounted for practically 47 percent of the crop. The only other important outlet for the merchantable fruit was thru brokers, who handled 22.5 percent of the crop.

Altho in 1935 about 32 percent of the late apples produced in western Illinois were sold on consignment, very few of the late crop have been handled on that basis since that year. Merchant truckers have become a very important outlet for late varieties from both western and southern Illinois, dominating the sales in both regions in 1939. Sales to wholesale dealers were next in importance in both areas that year, while sales thru brokers[1] and cooperatives[2] each averaged 8 to 10 percent of the total sales during 1937-1939.

In western Illinois in years of heavy crop it is not unusual for more than 20 percent of the crop sold at harvest time to go to the cider mills, principally for the manufacture of vinegar. In 1941 the percentage thus sold was 22.3. In the southern Illinois producing regions few cider mills are operating, and hence this outlet is not readily available to any large proportion of the growers. Cider apples here are either wasted or fed to livestock, if not included in some of the Unclassified stock sold to truckers.

[1]Brokers with headquarters in the producing area during the harvest season solicit by wire and secure orders from wholesale dealers in terminal markets for specific cars of apples to be billed out at a specified time and price. Sometimes the broker assumes collection of the account. For his services he is paid by the grower a stipulated rate per bushel or per carload.

[2]See discussion of cooperatives on page 527.

Formerly a common method of sale for late apples was a preharvest contract between the grower and an apple buyer who visited the producing region in June, July, or August, and either bought the crop on the trees for a lump sum or agreed to pay a stipulated price per barrel for the packed fruit delivered at the loading point. In either case a part of the purchase price was paid at the time the contract was signed, and provision was made for the payment of the balance when the fruit was shipped. If the fruit was purchased on a package basis, specifications regarding the grading and packing were included in the contract.

The other principal outlet in the early days was consignment to commission merchants in the large city markets, particularly Chicago and St. Louis. More Illinois apples were formerly sold by this method than by all other methods combined, even tho the crops from some of the larger orchards were handled on a package basis by resident brokers in the producing areas. Aside from local retail sales, these three methods constituted practically all the methods of selling Illinois apples until comparatively recent times. The Levee Sale at St. Louis was on a commission basis, and the apples shipped for that sale were consigned to commission merchants.

Outlets for Early Apples

Outlets employed for early apples produced in southern Illinois in 1938 and 1939 and in western Illinois in 1939 are shown in Table 13.

In the southern Illinois areas the principal outlet for early apples is thru resident brokers who have well-established business connections and distribute the products over a wide consuming territory. Smaller quantities are marketed thru cooperative agencies, particularly the Illinois Fruit Growers Exchange, by consignment to commission merchants, and by direct sales to merchant truckers. These four methods accounted for 90 to 95 percent of the sales in 1938 and 1939.

Outlets for Different Grades of Apples

Sales of apples reported by 114 growers in four western Illinois counties in the fall of 1937 indicated that nearly three-fourths of the apples of U. S. No. 1 grade were marketed either by outright sales to wholesale dealers, thru cooperatives, or thru brokers. Over 90 percent of the Utility grade and 47 percent of the Combination grade were disposed of thru these same outlets, but these two grades represented a very small percentage of the total volume sold.

Sixty-seven percent of the Pie apples were sold directly to pie companies, while the 30 percent handled thru wholesale dealers, cooperatives, and brokers undoubtedly eventually reached the pie companies. The principal outlet for Unclassified stock was thru merchant truckers, who handled 55 percent of this type of fruit. Nearly all the cider stock sold went directly to the cider mill (Table 14).

TABLE 14.—PERCENTAGE OF EACH GRADE OF WESTERN ILLINOIS APPLES SOLD THRU EACH SALES OUTLET, FALL, 1937

Outlet	U. S. No. 1	Utility	Combination	Pie	Unclassified	Cider apples	All grades
	perct.	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*
Sales to wholesale dealers	39.7	13.1	23.5	9.6	17.9	....	20.1
Consignment to commission merchants	8.9	1.2	14.6	....	2.2	....	3.9
Cooperative organizations	15.4	36.4	10.2	11.0	5.5	1.4	8.8
Brokers	18.2	41.4	13.8	9.4	5.3	....	9.4
Merchant truckers	8.3	5.0	15.7	2.6	55.2	....	22.9
Pie companies	....	....	....	67.4	.5	....	4.6
Cider mills	....	....	....	....	....	98.6	22.0
Growers on terminal markets	.9	....	....	....	2.3	....	1.1
Direct to consumers	5.1	.3	3.2	....	8.4	....	4.7
Retail dealers	2.5	....	19.0	....	1.5	....	1.7
Other outlets	1.0	2.6	....	....	1.2	....	.8
Total percent	100	100	100	100	100	100	100
Total bushels	130 407	9 042	8 162	27 233	149 464	93 767	418 075

In 1941 a much larger percentage of the No. 1 stock was handled by brokers than in 1937, more than half being sold thru this outlet. The next important outlet for No. 1 stock was directly to wholesale dealers. These two outlets accounted for 82 percent of the No. 1 apples and also for about 78 percent of the Utility grade (Table 15). Brokers alone handled 81 percent of the Combination grade; and wholesale dealers and brokers together, all the Pie grade. However, these three grades together (Utility, Combination, and Pie) made up only 7.3 percent of the total output.

The most important outlet for the Unclassified stock in 1941 was the merchant truckers, who handled directly from the growers nearly as much as the wholesale dealers, cooperatives, and brokers combined. Practically all the "tree-run" fruit sold without sorting was handled by wholesale dealers and merchant truckers, the largest quantity being sold to wholesale dealers who operated packing sheds. Nearly all the

TABLE 15.—PERCENTAGE OF EACH GRADE OF WESTERN ILLINOIS APPLES SOLD THRU EACH SALES OUTLET, 1941[a]

Outlet	U. S. No. 1	Utility	Combination	Pie	Unclassified	Tree run	Cider	All grades
	perct.	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*
Wholesale dealers	31.2	51.6	....	77.5	16.6	68.2	....	24.6
Commission merchants	3.1	21.2	4.4	....	2.9	....	....	2.3
Cooperative organizations	8.8	....	....	....	16.1	....	4.0	5.0
Brokers	51.4	26.5	81.5	22.5	16.8	....	....	22.5
Merchant truckers	5.1	.7	14.1	....	45.4	31.8	....	22.3
Pie companies	....	....	....	....	....	....	....	....
Cider mills	....	....	....	....	....	....	96.0	22.3
Grower on terminal market	....	....	....	....	.1	....	....	....
Direct to consumers	.4	[b]	[b]	....	1.6	[b]	....	.8
Retail dealers	[b]	....	....	....	.5	....	....	.2
Total percent	100	100	100	100	100	100	100	100
Total bushels	50 937	4 560	5 101	6 676	78 211	21 641	47 411	214 537

[a]Does not include stored apples. [b]Negligible (less than .1 percent).

cider stock went directly from the grower to the cider mill, tho a small quantity graded out at cooperative packing sheds was sold to the cider mill by the cooperative. Of merchantable grades sold in large volume, brokers and wholesale dealers handled most of the No. 1 stock and merchant truckers a large proportion of the Unclassified stock.

Sales in Packages and in Bulk

Data collected from interviews with growers in western Illinois in 1937, 1939, and 1941 and in southern Illinois in 1938 and 1939 indicate

TABLE 16.—PERCENTAGES OF APPLES SOLD IN PACKAGES AND IN BULK, WESTERN AND SOUTHERN ILLINOIS, 1937-1941

	Bushels	Packed	Bulk		Total
			Fresh market	Cider	
Late apples		*perct.*	*perct.*	*perct.*	*perct.*
Western Illinois, 1937	768 849	52.4	33.4	14.2	100
Western Illinois, 1939	373 957	39	43	18	100
Western Illinois, 1941	214 537[a]	41.2	36.5	22.3	100
Southern Illinois, 1938	76 309	56.6	43.4	....	100
Centralia district, 1939	115 034	44	51	5	100
Anna district, 1939	91 973	50	49	1	100
Early apples					
Southern Illinois, 1938	92 369	97.3	2.7	....	100
Centralia district, 1939	13 498	86	14	....	100
Anna district, 1939	164 188	89	10	1	100

[a]Does not include stored apples.

TABLE 17.—PERCENTAGE OF CROP OF DIFFERENT VARIETIES SOLD IN PACKAGES

Variety	Western Illinois			Southern Illinois	
	1937	1939	1941	1938	1939
Early	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*
Yellow Transparent	....	100	....	97.5	90
South Carolina Summer	....	...	....	98.4	86
Duchess	....	100	....	97.7	87
Wealthy	....	76	....	83.9	83
Other and mixed	....	100	....	97.9	95
Late					
Jonathan	69.6	53	52.4	57.5	66
Delicious	54.5	53	50.3	58.2	54
Golden Delicious	62.5	63	50.0	63.3	65
Grimes	61.5	22	54.4	82.7	60
Willow	59.4	39	45.0	....	..
Winesap	64.5	31	.7	61.1	36
Ben Davis and Gano	10.2	24	45.9	[a]	24
Rome and Red Rome	65.7	8	8.4	39.1	25
Champion	[a]	19	60.6	....	..
King David	35.7	43	69.1	[a]	16
York	69.4	43	....	[a]	29
Stayman	58.6	88	....	14.2	37
Black Twig	39.1	[a]	2.0	[a]	..
Kinnard	....	..	....	49.6	[a]
Other and mixed	35.2	4	21.5	45.6	25

[a]Included in other and mixed varieties.

TABLE 18.—PERCENTAGE OF EACH GRADE IN PACKAGED AND BULK LATE APPLES SOLD FROM FOUR WESTERN ILLINOIS COUNTIES, 1937 AND 1939

Grade	Western Illinois, 1937			Western Illinois, 1939		
	Packaged	Bulk	Total	Packaged	Bulk	Total
	perct.	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*
U. S. No. 1	76.3	9.1	42.6	68	...	27
Utility	5.1	1.6	3.4	10	1	4
Combination	5.1	1.8	3.4	4	...	1
Pie	5.2	3.8	4.5	9	...	4
Unclassified	8.3	53.1	30.8	9	69	46
Cider	....	30.6	15.3	...	30	18
Total percent	100	100	100	100	100	100
Total bushels	....	....	604 083	...	...	373 957

that bulk sales have been particularly prominent in the handling of the late crop (Table 16). Early varieties, with the possible exception of Wealthy, are not adapted to bulk handling. Among late varieties there have been wide differences in the percentages sold in packages, and there has also been wide variation from year to year in the percentage of a given variety that was packaged in a given locality (Table 17).

A consistently high percentage of Golden Delicious was packed. As an average, the percentage of Jonathan packed was also quite high, and the percentage of Delicious was quite consistent and fairly high. On the other hand, the percentage of Grimes, Willow, Winesap, Rome, York, and Stayman respectively was exceedingly variable, depending probably upon market conditions, the quality of the crop, and sales opportunities.

The low percentage of Ben Davis and Gano packaged each year except in 1941 was undoubtedly due to the low prices of these varieties and the narrow margin between bulk and package prices.

A large percentage of the *packaged* fruit was of the No. 1 grade and more than 90 percent of the apples sold in bulk in southern Illinois

TABLE 19.—PERCENTAGE OF EACH GRADE IN PACKAGED AND BULK APPLES SOLD FROM SEVEN SOUTHERN ILLINOIS COUNTIES IN 1938 AND FROM ELEVEN SOUTHERN ILLINOIS COUNTIES IN 1939

Grade	Southern Illinois, 1938 (early and late combined)			Southern Illinois, 1939 (late apples)		
	Packaged	Bulk	Total	Packaged	Bulk	Total
	perct.	*perct.*	*perct.*	*perct.*	*perct.*	*perct.*
U. S. No. 1	74.2	.1	58.6	83	3	40
Utility	6.1	3.3	5.5	6	...	3
Combination	4.9	5.8	5.1	2	...	1
Pie	....	....	....	....	....	....
Unclassified	14.8	90.8	30.8	9	91	53
Cider	....	....	....	....	6	3
Total percent	100	100	100	100	100	100
Total bushels	....	....	168 678	....	...	207 007

were Unclassified fruit. In western Illinois also a large percentage of the fruit sold in bulk in 1937 and 1939 was either Unclassified or cider stock (Tables 18 and 19). In 1941 approximately 80 percent of the bulk stock sold in western Illinois was either Unclassified or cider stock, while 17 percent was ungraded "tree-run" stock sold in field crates to dealers equipped for packing (Table 9, page 516).

COOPERATIVE PACKING AND MARKETING

Illinois Fruit Growers Exchange

Cooperative marketing of fruit has been carried on in Illinois continuously since the incorporation of the Illinois Fruit and Vegetable Growers Exchange in June, 1921, tho the name of the organization

TABLE 20.—APPLE PRODUCTION IN THE UNITED STATES AND IN ILLINOIS, 1919 TO 1942

Year	Total crop		Commercial crop[a]	
	Illinois	United States	Illinois	United States
	1,000 bu.	*1,000 bu.*	*1,000 bu.*	*1,000 bu.*
1919	4 673	140 632	2 136	78 477
1920	5 690	206 688	4 107	101 715
1921	1 670	95 638	1 191	64 671
1922	9 006	189 425	4 350	95 835
1923	7 035	180 915	4 200	107 808
1924	5 529	160 457	3 300	84 039
1925	5 800	152 424	3 645	99 738
1926	7 227	229 656	3 870	117 384
1927	3 218	115 708	2 250	78 051
1928	5 018	177 813	3 720	106 383
1929	3 360	135 092	2 400	86 664
1930	3 528	156 617	2 808	100 587
1931	8 700	205 403	5 490	103 776
1932	2 300	146 849	1 650	85 776
1933	2 420	148 657	1 600	77 232
1934	2 724	125 719	2 270	103 691
1935	7 888	177 916	4 440	140 503
1936	1 834	117 506	1 382	98 608
1937	8 960	210 783	4 395	156 376
1938	2 912	132 354	1 447	109 595
1939	.....	.....	4 107	143 085
1940	.....	.....	1 876	114 391
1941	.....	.....	3 410	122 059
1942	.....	.....	2 970[b]	127 655[b]

[a]See footnote to Table 26, page 540, for explanation of "commercial crop." [b]Preliminary.

has been successively changed to Illinois Fruit Exchange and to Illinois Fruit Growers Exchange. Incorporated originally under the provisions of an old law enacted in 1872, it was thoroly reorganized and incorporated as the Illinois Fruit Growers Exchange in February, 1924, under the new Cooperative Marketing Act passed by the Illinois legislature in June, 1923. This law made it possible to incorporate a central organization whose membership consisted of incorporated local

associations as well as individual growers. Local "units" provided for under the old law were incorporated as local associations; new associations were organized at several places, and individual growers with large orchards where there were no local associations were also admitted to membership.

Individual growers now predominate in the membership of the Exchange, for with the increase in truck movement of fruit and the tendency for merchant truckers to go directly to the orchards, many local associations ceased to operate. Sales of fruit packed by associations and by individual members have all been made thru the sales department of the Exchange, and wide distribution of the products has been secured.

Apples and peaches have been the two commodities most extensively handled by the Exchange. Packing sheds were built, bought, or leased, and were operated on a cooperative basis to pack the fruit produced by members of local associations. Individual growers with large acreages operated their own sheds.

The amount of fruit handled by the Exchange has never been a large part of the total production in the state, even tho the Exchange has furnished its members a large amount of field service in addition to sales service and has been a leader in the introduction of up-to-date practices and methods such as thinning of peaches, shipping-point inspection, brushing of peaches, spray-residue removal from apples, and precooling of shipments in hot weather. The largest volume of apples handled in any one crop-year was equivalent to slightly over 400 cars (about 210,000 bushels). This was in 1937, the year of largest apple production in the state within recent times (Table 20).

Calhoun Apple Exchange

The other active Illinois cooperative engaged in marketing apples is the Calhoun Apple Exchange. The packing facilities of this exchange were especially in demand in 1942 because of superior equipment for spray-residue removal and the renewed interest in apple washing that season.

Prior to the organization of this exchange, several attempts were made in Calhoun county to market apples cooperatively but each attempt was short-lived. In 1935 the Exchange acquired title to the packing shed and the equipment operated by one of the former organizations. This shed had originally been located in Hardin, but had been torn down, moved, and rebuilt in East Hardin. The shed was operated for custom packing in 1936 but the packing facilities were greatly enlarged in 1937 and a complete sales service was inaugurated. Many new members were secured and the total volume of apples handled in that year of large crop was reported to have been approximately 120,000 bushels, or about 227 carloads.

PRICES OF ILLINOIS APPLES

1937 Prices to Western Illinois Growers

In the apple-marketing survey made in western Illinois in the fall of 1937 and winter of 1937-38, price data were obtained from 114 growers who marketed 418,075 bushels of apples.

Prices were established at low levels at the beginning of the harvest of fall varieties and held fairly steady during the harvest season. Prices for Jonathan, Winesap, and Willow f.o.b. shipping point ranged mostly from 75 to 90 cents a bushel basket, U. S. No. 1 grade. Altho prices at harvest were considered very low, even lower returns were received by growers who stored for sale later in the season.

Lower prices were paid for Grimes than for other leading varieties except Ben Davis, of which very few were sold as packaged U. S. No. 1 stock. Prices on Grimes ranged from 60 to 70 cents a bushel basket. Only a small proportion of Grimes were sold as U. S. No. 1 because Combination and Utility brought almost as much. Prices paid for pie-grade Grimes compared favorably with prices for No. 1 grade.

Because of variation in quality, Delicious and Golden Delicious sold over a wider price range than the other leading varieties; the range for Delicious was 75 cents to $1.15 per bushel basket, for U. S. No. 1 grade. The highest prices were for highly colored and otherwise excellent-quality Delicious. On the other hand, many growers had difficulty in putting up No. 1 packs of Delicious since there was too much scab, and many sales of Delicious were made at less than the average price for other varieties. Prices for Golden Delicious ranged from 65 cents to $1.00 a bushel basket, U. S. No. 1 grade. Many growers had heavy loads on their trees and consequently small apples, which of course did not sell so well as larger ones.

Prices paid for Utility, Combination, and Unclassified grades of different varieties ranged from 55 to 65 cents a bushel basket.

TABLE 21.—AVERAGE NET PRICE PER BUSHEL BASKET TO GROWERS FOR SPECIFIED VARIETIES OF U. S. NO. 1 APPLES: WESTERN ILLINOIS, FALL OF 1937

Variety	Net price per bushel basket[a]	Percent of average price
Jonathan	$.75	93.8
Grimes	.62	77.5
Delicious	.85	106.2
Golden Delicious	.83	103.8
Winesap	.81	101.2
Willow	.75	93.8
Miscellaneous varieties	.70	87.5
All varieties	.80	100.0

[a]All price comparisons are for net price to growers per bushel basket, U. S. No. 1 grade. Charges for selling, transportation, and other cash items incurred after apples were packed and ready for market were deducted from the gross price.

Truckers bought large quantities of bulk apples at orchards and packing sheds. The most common price paid for miscellaneous varieties of Unclassified bulk stock, consisting mostly of apples sorted out of graded fruit, was 15 cents a bushel or field crate. Some of the more desirable varieties sold at slightly higher prices. Prices paid by truckers for bulk tree-run or orchard-run apples at the orchard ranged from 15 to 40 cents a crate, depending on variety and quality.

For sales made during or shortly after harvest and reported by growers, Delicious, Golden Delicious, and Winesap sold at higher average net prices per bushel basket, U. S. No. 1 grade, than Jonathan and Willow. Lowest prices were received for Grimes (Table 21).

Returns to growers from consignment sales were lower than from outright sales and from sales made thru cooperatives and other agencies operating in the producing territory.

More Jonathans were consigned than any other variety. This movement was heaviest during the early harvest season. The highest net returns received by growers were on some of the earliest lots sent before terminal market prices broke under the influence of heavy offerings.

On sales of 24 separate lots totaling 5,000 bushels, the average net return to growers for Jonathan apples consigned was 69 cents a bushel basket. Jonathans sold to or thru other agencies brought 75 to 80 cents net.

Price Differentials in 1939

In 1939 price data were secured on the sales of 102,762 bushels of early apples, principally from southern Illinois and sold in *bushel baskets,* and 64,359 bushels of late apples sold in *bushel baskets*—38,037 bushels of the latter being from western Illinois and 26,322 from southern Illinois. Data were also collected on the sales of 12,581 bushels of early apples principally from southern Illinois and sold *in bulk,* and 104,567 bushels of late apples sold *in bulk,* 45,898 bushels of the late apples being from western Illinois and 58,669 bushels from southern Illinois.

General price ranges. The price ranges and the percentage of a given class of apple sold in each range in 1939 are indicated in Figs. 8 and 9. The prices given are net to the grower after deducting any transportation or sales charges incurred.

Of the early varieties sold in baskets, the highest percentage, 25.2, sold for 61 to 70 cents a bushel. Fifty percent of the early basket apples sold for 51 to 80 cents a bushel. The late apples in baskets ranged more than 10 cents higher—the highest percentage of these apples, 24.1, selling for 71 to 80 cents and more than 57 percent selling for 61 to 90 cents. Only 19.4 percent of these late basket apples sold above 90 cents a bushel.

The bulk apples sold for considerably less per bushel than the packaged apples. Of the *early* bulk apples, 27.4 percent sold for 11 to 20 cents a bushel and another 25 percent for 21 to 30 cents. Very few

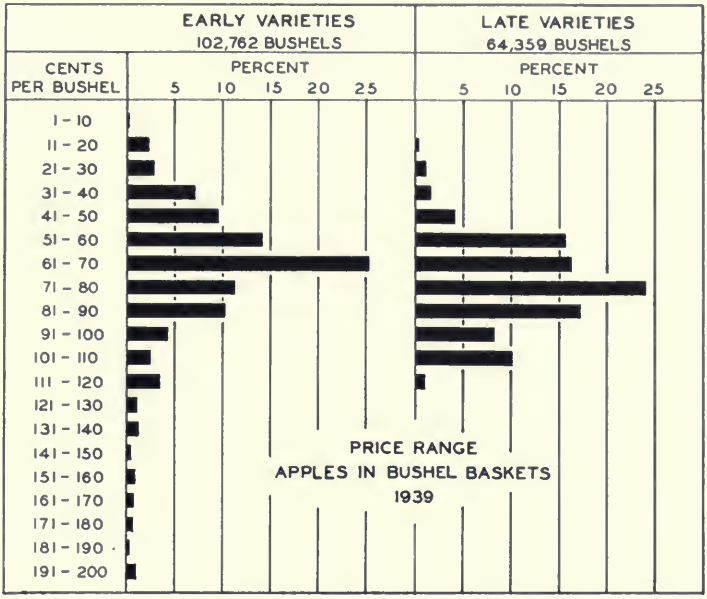

Fig. 8.—Prices of Illinois packed apples in 1939, showing percentage of early and late varieties that brought growers the net prices indicated. Transportation and sales charges have been deducted.

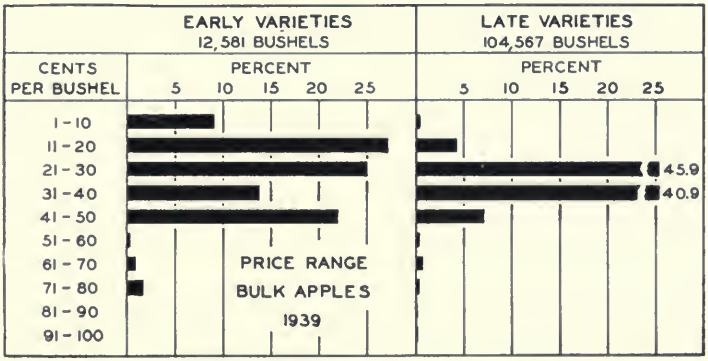

Fig. 9.—Prices of Illinois bulk apples in 1939, showing percentage of early and late varieties that brought growers the net prices indicated. Transportation and sales charges have been deducted.

TABLE 22.—AVERAGE NET PRICE PER BUSHEL TO GROWERS FOR SPECIFIED VARIETIES AND GRADES OF APPLES PACKED IN BUSHEL BASKETS AND IN BULK: COMBINED WESTERN ILLINOIS, MARION COUNTY, AND UNION COUNTY AREAS, 1939*

Variety	Total packed	Price per bushel basket packed					Total in bulk	Price per bushel in bulk					
		All grades	U. S. No. 1	Utility	Combination	Unclassified		All grades	U. S. No. 1	Utility	Combination	Pie	Unclassified
	bu.						*bu.*						
Early													
Yellow Transparent	78 699	$.72	$.73	$.46	$.53	$.48	8 562	$.32	$.50	$.31	...	...	$.31
South Carolina Summer	4 435	.65	.65	.20	...	.48	1 200	.31	...	...	...	...	.31
Duchess	11 850	.64	.66	.45	.43	.76	1 700	.19	.50	...	...	...	.18
Other	7 778	.76	.63	...	.55	.68	1 119	.34	...	.56	...	...	.25
All early	102 762	.70	.71	.46	.46	.54	12 581	.30	.50	.42	...	...	.29
Late													
Jonathan	25 859	.74	.77	.58	.65	.50	18 838	.32	...	...	...	...	.32
Golden Delicious	11 432	.81	.83	.59	...	.50	11 310	.36	.40	.45	...	...	.36
Willow	60	.75	.75	...	...	...	5 747	.34	...	...	$.71	$.40	.31
Delicious	12 499	.90	.96	.60	.67	.59	11 208	.29	.65	...	...	...	.29
Winesap	946	.78	.78	...	.75	...	6 092	.34	...	.45	.47	...	.37
Grimes	5 745	.61	.62	.50	...	...	18 144	.29	...	...	...	...	.29
Ben Davis	1 365	.65	.65	...	...	.40	9 939	.33	...	.40	...	...	.35
Rome	1 150	.76	.76	...	...	...	12 569	.36	...	...	...	...	.36
Champion	196	.56	.62	...	.45	...	457	.30	...	...	...	...	.30
King David	693	.55	.39	...	.60	...	118	.38	...	...	...	...	.38
York	928	.75	.75	...	...	...	4 307	.32	.50	.40	...	...	.32
Stayman	1 210	.57	.78	.49	...	.75	1 015	.35	...	...	...	...	.35
Other and mixed	2 274	.66	.67	.33	...	.52	4 823	.31	...	.45	...	...	.31
All late	64 359	.76	.78	.57	.62	.54	104 567	.33	.36	.41	.63	.40	.34

*The data in this table are based on the sale of 284,269 bushels of apples in 1939, and include apples from 154 growers in the three commercial apple areas.

sold above 50 cents. Of the *late* apples sold in bulk, 45.9 percent sold for 21 to 30 cents a bushel, and another 40.9 percent for 31 to 40 cents.

There was considerable difference in the prices received for different varieties and a wide range of prices for different grades within a variety (Table 22).

Relation of variety to price. In the packaged fruit, Delicious sold for a distinctly higher price than any other variety; Golden Delicious was next in order. Among the important varieties, Grimes sold for the lowest price, even less than Ben Davis. Winesap and Willow sold for slightly more than Jonathan. Among the less-important late varieties, Rome and York brought the best prices; Champion and King David did not sell so well. The average price for Stayman also was low, even tho the No. 1 stock sold for as much as the No. 1 Jonathan. Yellow Transparent was much the best-priced among the summer varieties.

Among the different varieties sold in bulk there were much narrower differences in price. Delicious was one of the lowest priced apples when sold in bulk. This may seem odd, but Delicious is primarily an eating apple, and bulk stock is sold mainly for cooking. Furthermore, a large percentage of the bulk stock is of the Unclassified grade. Delicious apples other than No. 1 are not much in demand.

Packaged versus bulk apples. In most varieties the packaged fruit sold for more than double the price of the bulk stock. There were much wider differences in price among varieties in the packaged apples than among the bulk apples, the greatest difference in packaged goods being as much as 35 cents a bushel (prices ranging from 55 to 90 cents); whereas in the bulk stock of *late* varieties the greatest difference was only 9 cents (prices ranging from 29 to 38 cents).

The average price for all the specified late varieties sold in packages was 76 cents a bushel, while the average price of the bulk stock in the same varieties was only 33 cents. However, a high percentage of the packaged fruit was of the U. S. No. 1 grade, while a high percentage of the apples sold in bulk consisted of Unclassified fruit (Tables 18 and 19). Considering the difference in grade and the cost of packages and packing, it is probable that the bulk stock sold at as near its true value as the packaged stock.

Influence of grade on price. For most varieties of the packaged apples there was a marked difference in price between the No. 1 stock and any of the other grades. (Of some varieties evidently only the No. 1 stock was packaged.) For Delicious, Golden Delicious, and Ben Davis this difference amounted to 24 to 29 cents a bushel; for Yellow Transparent, 20 cents; and for Grimes and Jonathan, 11 and 12 cents respectively (Table 22). The average difference for all varieties was 16 cents. Normally the Combination grade sold for more than the Utility, but in some varieties the Unclassified stock sold for a better average

TABLE 23.—AVERAGE NET PRICE TO GROWERS FOR U. S. NO. 1 APPLES SOLD IN BUSHEL BASKETS TO OR THRU DIFFERENT TYPES OF BUYERS OR AGENCIES: COMBINED WESTERN ILLINOIS, MARION COUNTY, AND UNION COUNTY AREAS, 1939

Variety	Total outright sales	Prices for outright sales to—						Total sales thru agencies	Prices for sales thru—		
		All types of buyers	Merchant truckers	Local and city wholesale dealers	Retail dealers	Consumers	Miscellaneous[a]		All types of agencies	Commission merchants	Brokers and cooperative organizations
	bu.							*bu.*			
Early											
Yellow Transparent	4 377	$.72	$.66	$.77	$.69	$.85	...	70 145	$.74	$.62	$.78
South Carolina Summer	3 056	.71	.70	.73	...	...	...	1 351	.53	.64	.47
Duchess	1 054	.64	.80	.64	...	...	...	9 145	.66	.58	.66
Other	186	.73	.75	.60	...	...	...	7 294	.72	.64	.99
All early	8 673	.71	.69	.72	.69	.85	...	87 580	.73	.62	.77
Late											
Jonathan	8 523	.76	.74	.78	.70	.85	...	14 790	.75	.76	.76
Golden Delicious	4 161	.81	.77	...	.84	1.00	...	6 335	.85	.65	.85
Willow	60	.75	...	...	.75	...	...	.....	...	...	...
Delicious	2 586	1.02	.94	1.04	...	...	...	7 698	.94	.56	.96
Winesap	370	.83	.85	...	.75	.95	...	528	.75	...	.75
Grimes	4 968	.59	.68	.58	...	.70	$.50	542	.63	.52	.65
Ben Davis	299	.65	...	.65	.61	...	...	1 056	.65	...	.65
Rome	500	.75	...	.75	...	...	...	652	.76	...	.76
Champion	.....	...	...	...	...	...	...	124	.62	.65	...
King David	.....	...	...	...	...	...	...	172	.39	...	.39
York	728	.75	...	.75	...	...	.75	200	.75	...	.75
Stayman	.....	...	...	...	...	...	...	634	.78	...	.78
Other	273	.64	.65	.63	...	...	...	1 750	.68	.80	.64
All late	22 464	.75	.77	.76	.74	.95	.71	34 481	.81	.74	.82

[a]Includes sales to Federal Surplus Commodities Corporation and to institutions.

price than one or both of these grades. This was especially true of the early varieties.

If all late varieties are considered together, the order of the different grades, in price, is: U. S. No. 1, Combination, Utility, Unclassified. This is a logical sequence, in view of the differences in the quality of the different grades. Discrepancies in the prices of the Unclassified stock of certain varieties were undoubtedly due to irregularities in grading or marking. Altho the Unclassified mark is normally used to designate fruit that will not meet the requirements of either the Utility or the Combination grade, it may be put on anything, all the way from culls to No. 1 stock.

Prices obtained thru different sales outlets. Sales directly to consumers brought the highest prices per bushel but made up a very small percentage of the total sales. Comparison of the average net prices received by growers for U. S. No. 1 apples packed in bushel baskets indicates that of the sales outlets thru which relatively large volumes were sold, the brokerage firms and cooperative organizations made the best returns, tho for some varieties, direct sales to wholesale dealers proved to be most advantageous. This was true of South Carolina Summer and Delicious. Returns from sales thru commission merchants were especially unfavorable for Delicious, Golden Delicious, and Grimes. Merchant truckers were a more favorable outlet for Grimes, Winesap, and Duchess than for other varieties in the No. 1 grade. However, their purchases of this grade were rather limited. Retail dealers paid especially well for Golden Delicious compared with other varieties and apparently discriminated against the Jonathan (Table 23).

Prices of Western Illinois Apples in 1941

A survey made in western Illinois during and immediately following the apple harvest in the fall of 1941 showed that prices received by growers for their fruit were much higher than in 1937 and 1939, the two immediately preceding heavy-crop years (Table 24). This was especially true of the packed fruit, but also applied to bulk fruit of all varieties except Jonathan and Delicious.

Every variety of apple showed a higher price for No. 1 packed stock in 1941 than in 1939 (Table 24), the average (weighted) increase being 30 cents a bushel, which brought the price 38 percent above 1939.[1] Of the fruit sold in bulk, the Unclassified stock makes up the larger proportion and so is used here for comparison. The Unclassified Jonathan and Delicious unaccountably sold for slightly lower prices in 1941 than in 1939; other prominent varieties showed

[1]The quantities of apples of the 1941 crop involved in these comparisons were about 50,000 bushels of packed No. 1 stock and nearly 55,000 bushels of Unclassified bulk stock. In 1939 the quantities involved were somewhat smaller.

TABLE 24.—AVERAGE NET PRICES PER BUSHEL TO GROWERS FOR U. S. No. 1 PACKED AND UNCLASSIFIED BULK APPLES OF SPECIFIED VARIETIES SOLD AT HARVEST TIME: WESTERN ILLINOIS, 1937, 1939, 1941

Variety	U. S. No. 1 in bushel baskets				Unclassified (bulk)		
	1937	1939	1941	Increase 1941 over 1939	1939	1941	Increase 1941 over 1939
Jonathan	$.75	$.74	$1.11	$.37	$.28	$.27	$−.01
Delicious	.85	.98	1.21	.23	.34	.33	−.01
Golden Delicious	.83	.85	1.22	.37	.26	.50	.24
Grimes	.62	.59	.80	.21	.28	.39	.11
Willow	.75	.75	1.06	.31	.31	.44	.13
Winesap	.81	.79	1.25[b]	.46	.28	.55[b]	.27
Ben Davis	[a]	.65	.90	.25	.34	.48	.14
Other varieties	.70	.61	.99	.38	.31	.39	.08
All varieties	.80	.79	1.09	.30	.31	.37	.06

[a]Included in other varieties. [b]Very small sample.

increases of 11 to 27 cents a bushel. The average (weighted) increase for all varieties was 6 cents a bushel in spite of the large volume of Jonathan and Delicious sold at one cent a bushel under the 1939 prices. This is an increase of 19 percent.

The increase in price of No. 1 packed fruit in 1941 was very gratifying to the orchardists of western Illinois. Prices for the 1942 apple crop were much higher than for the 1941 crop. However, no detailed price data were collected in the Illinois producing areas in 1942.

GOVERNMENT PURCHASES OF APPLES

With a view to removing surplus apples from the fresh fruit market and thereby assisting in maintaining price levels, government apple-purchasing programs were carried on in a number of apple-producing states each year of heavy crop production after 1934. Such programs were set up in Illinois for the crop years 1935, 1937, 1939, and 1941.

1935. Purchases of apples from the 1935 crop were made by the Federal Surplus Commodities Corporation from cold-storage holdings beginning rather late in the storage season and continuing until May 15, 1936. Two hundred thirty-seven carloads of Illinois apples were bought by the Government that season and distributed thru the Illinois Emergency Relief Commission to families on relief.

1937. A purchase program was again instituted in 1937 with a view to purchasing apples at harvest time, but there was so much delay in opening an office in Illinois that the harvest season was nearly over before the Government was ready to handle the apples. As a result, only 15 carloads were purchased while the office was in operation from October 22 to November 13. The office was reopened February 15, 1938, for the purchase of Illinois apples from storage, and 64

carloads were bought by the Government between February 21 and April 15.[1]

1939. At a meeting of the Illinois State Committee on Apple Purchase Program, held in Centralia August 30, 1939, a resolution was wired to Washington urging the Federal Surplus Commodities Corporation to set up an apple-purchase program in Illinois and to put it into immediate operation so as to handle Jonathan, Grimes, and other fall and early winter varieties during the harvest season.

After a general apple meeting held in Washington, D. C. on September 14 and 15 to discuss plans for a country-wide apple purchase program, arrangements were made for a purchase program in Illinois and actual purchasing began October 9. By this time most of the crop had been marketed or stored, and only 21 cars of Illinois apples were offered to the Government; all these were purchased before November 12. No Illinois apples of the 1939 crop were purchased from storage by the Government.

1940. Because of a light crop in Illinois as well as in a number of other midwestern states in 1940, there was no interest in a government apple-purchase program among Illinois growers even tho such a program was carried on in several other states and led to the purchase of 3,100,000 bushels up to December 7 and a total of 14,134 carloads (7,462,774 bushels) for the season.

1941. Following a meeting of the National Apple Planning Committee in Washington, D. C. on August 11, 12, and 13, 1941, at which a resolution was passed recommending "an Apple Purchasing Program to commence as soon as possible," a meeting of the Illinois Peach and Apple Industries Committee (which had been appointed before the peach harvest) was held in Centralia on August 21, 1941, to consider a government apple-purchase program for Illinois.

At this meeting a motion was passed "that the Surplus Marketing Administration [at that time the name of the federal agency making purchases of surplus commodities] be requested to set up an apple-purchasing program in Illinois by September 1 in order to be in a position to purchase Jonathan and Grimes."

A general announcement that the Surplus Marketing Administration was planning to purchase apples in various producing states appeared in *The Chicago Packer* for August 30, 1941, in which the opening prices on Jonathan were named at $1.00 and on Grimes at 95 cents.[2] This information was disseminated rapidly thru the apple-producing areas. The Government, however, was not ready to make

[1]Of the apples stored by western Illinois growers interviewed in the fall of 1937, 83 percent were reported to be of U. S. No. 1 grade.

[2]This price on Grimes was inoperative in Illinois because it called for a 2½-inch apple.

purchases in Illinois until September 15. By that time a large proportion of the Jonathan and Grimes crop had been harvested and marketed. But the knowledge that a purchase program was likely to start almost any day at the prices indicated is reported to have established the price for apples at least 15 cents a bushel above that which would otherwise have been obtainable.

As the season progressed, prices offered for other varieties were announced. There was a differential in price between different sizes of the same variety when more than one size was acceptable. Purchases were limited to the U. S. No. 1 grade.

The purchasing office of the Surplus Marketing Administration in Springfield was maintained until November 11. Total purchases of Illinois apples amounted to only ten cars. In spite of the small quantity of apples purchased, the general feeling among growers was that the purchase program had been very beneficial to the apple industry of the state by serving as a stimulus to the market. The chief criticism from growers at the close of the program was that it was started too late for handling the Jonathan, which is the most important Illinois variety and the harvest of which began more than two weeks before the government was ready to start actual purchasing.

Total purchases, 1934-1941. The quantities of apples involved in the government purchase programs from 1934 to 1941 inclusive are given in Table 25 on the basis of carloads, bushels, and percentages of the commercial crop for Illinois and for the United States as a whole. Relatively small quantities of Illinois apples were sold to the government agencies after the 1935 crop. The purchase programs were used much more extensively by some other producing areas. In the United States as a whole more than 6 percent of the 1939 and 1940 commercial crops and nearly 5 percent of the 1941 crop were taken under these programs. After January 10, 1942, government purchases included both those made for emergency relief and for lend-lease.

TABLE 25.—GOVERNMENT PURCHASES OF APPLES, 1934-1941

Crop year	Illinois			United States		
	Carloads[a]	Bushels[b]	Percent of crop[c]	Carloads[a]	Bushels[b]	Percent of crop[c]
1934	None	.....	....	393	207 389	.20
1935	237	125 025	2.23	5 015	2 648 262	1.88
1936	None	.....	....	27	14 330	.01
1937	79	43 772	.74	10 713	5 656 438	3.62
1938	None	.....	....	1 052	555 584	.50
1939	21	11 052	.23	17 155	9 057 803	6.33
1940	None	.....	....	14 134	7 462 774	6.52
1941	10	5 232	.15	11 839	6 250 942	4.95

[a]Calculated on the basis of 528 bushels to a car where data on number of carloads were lacking. [b]Data furnished by Purchase Branch of the Agricultural Marketing Administration, U. S. Department of Agriculture, August 13, 1942. [c]Commercial crop.

MARKETING PROBLEM IN YEARS OF HEAVY CROP

Even with government purchasing programs in operation in heavy crop years, most of the Illinois apples moved thru regular trade channels. Purchase programs may have stimulated the market, but the volume of Illinois apples disposed of in that way was exceedingly small compared with the total crop. The chief movement must be thru the usual trade outlets.

Best Time to Market

In spite of competition with other fruits and with apples from other producing areas, probably the most favorable time for putting the principal volume of most varieties of Illinois apples into consumption is during and immediately following their harvest. The high-quality Illinois apples that mature comparatively early, such as Jonathan, Grimes, Delicious, and Golden Delicious, are at their best during the fall months. If moved into consumption at that time, they tend to stimulate interest in apples despite abundance of other fruits, including grapes of both the eastern and the California types, pears from the West as well as local pears, late peaches and plums, local cantaloupes and watermelons, Valencia oranges from California, and the beginning of the new grapefruit crop from Texas and Florida, to say nothing of bananas, which are usually present except in wartime.

Interest in apples is most likely to be developed if the fall market is supplied with the better grades of the high-quality varieties. It has been a common practice to store most of the No. 1 stock of these varieties for winter sales and to offer only the lower grades for consumption during the fall months in many markets. At the meeting of apple growers held in Washington, D. C., in August, 1941, a concerted movement to keep the markets well supplied with high-grade stock of the early-maturing varieties thruout the fall months, instead of supplying them thruout that period with low-grade stock of all varieties, was strongly urged. The National Association of Food Chains and other trade organizations agreed to cooperate in such a movement. Disposition of the early-maturing varieties for immediate consumption was especially active during the fall seasons of 1941 and 1942.

Less Winter Storage of Heavy Crops

In years of heavy crop accompanied by low prices at harvest time, there has normally been a tendency for growers to store apples. In fact, during the depression years, many growers were practically forced to store a considerable portion of their crop because they lacked an outlet, since speculators had lost interest in buying apples for storing. In the absence of fall merchandising campaigns, storage hold-

TABLE 26.—COLD STORAGE HOLDINGS OF APPLES IN THE UNITED STATES, AS OF DECEMBER 1 EACH YEAR, AND PERCENTAGE OF CROP STORED, 1919-1942

Year	Total crop[a]	Commercial crop[a]	Cold storage holdings December 1[a]	Percent stored	
				Total crop	Commercial crop
	1,000 bu.	*1,000 bu.*	*1,000 bu.*		
1919	140 632	78 477	17 769	12.6	20.0
1920	206 688	101 715	20 361	9.8	20.0
1921	95 638	64 671	17 217	18.0	26.6
1922	189 425	95 835	20 229	10.7	21.1
1923	180 915	107 808	30 297	16.7	28.1
1924	160 457	84 039	22 419	14.0	26.6
1925	152 424	99 738	28 194	18.5	28.2
1926	229 656	117 384	31 458	13.7	26.9
1927	115 708	78 051	23 493	20.3	30.1
1928	177 813	106 383	31 177	17.5	29.3
1929	135 092	86 664	28 139	20.8	32.4
1930	156 617	100 587	32 580	20.8	32.4
1931	205 403	103 776	34 197	16.6	32.9
1932	146 849	85 776	29 433	20.0	34.3
1933	148 657	77 232	25 128	16.9	32.5
1934	125 719	103 691	30 983	24.6	29.9
1935	177 916	140 503	33 054	18.6	23.5
1936	117 506	98 608	26 486	22.5	26.9
1937	210 783	156 376	36 054	17.1	23.1
1938	132 354	109 595	30 815	23.3	28.1
1939	.....	143 085	30 988	....	21.7
1940	.....	114 391	33 838	....	29.6
1941	.....	122 059	31 181	....	25.5
1942	.....	127 655[b]	35 662	....	27.9

[a]From government statistics. Government estimates of *total* apple production were discontinued in 1939; hence, data for years since 1938 are not available. Figures for the "commercial crop," 1919 to 1933 inclusive, relate to apples sold for fresh consumption only, but include apples so sold from *all* areas in the United States. Beginning with 1934, all government estimates of commercial apple production relate only to production of apples in *commercial areas*, but include apples sold for processing and used on farms where grown as well as apples sold for fresh consumption. The commercial areas are now designated on a county basis. The commercial crop is the total production in the designated commercial counties. In 1940 there were 424 counties in the United States considered as commercial apple areas; these were distributed over 36 states; 17 were in Illinois (*see page 499*). [b]Preliminary.

ings will unavoidably be large in heavy-crop years, but these are the years in which fall selling campaigns should be most active. Under normal income conditions, large storage holdings usually result in low prices thruout the winter and spring.

The disastrous season of 1935-36 illustrates this point. Much No. 1 stock was sold out of storage in the spring for less net return to the grower than Unclassified stock sold for at harvest time the fall before.

The Illinois growers really learned their lesson in the spring of 1936, and since then have pushed fall sales in heavy-crop years. Storage holdings of Illinois growers have been less and less each succeeding heavy-crop year. In 1935 it was estimated that 32 percent of the entire crop of fall and winter apples in western Illinois was placed in cold storage as the property of the growers; in 1937, 24 percent; in 1939, 11 percent; while in 1941 the movement at harvest time was so active that only 5½ percent of the crop was stored by the growers.[1]

[1]These percentages were calculated from data secured in surveys made in the western Illinois apple area each of the seasons.

Cold-storage holdings as of December 1 in the United States as a whole are given in Table 26, together with the size of the crop and the percentage of the crop stored each year since 1919.

It has been estimated that under normal conditions of business activity and normal size of factory payrolls thruout the country, about 30 million bushels of apples in cold storage as of December 1 will fully supply the available markets, and that larger holdings are likely to result in disastrous prices. Movement of apples from storage is seriously retarded by severely cold winter weather. Competition with citrus fruits is much more active in winter than in the fall, for California, Florida, and Texas are all shipping freely. Canned fruits also enter the competition. Apples that remain in storage until spring have to compete with the new crop of strawberries from the South besides meeting the continued competition with the citrus fruits and also bananas under normal conditions.

Under the abnormal conditions which existed during the marketing and consumption of the 1942 late-apple crop, the situation with reference to quantity of storage holdings was not the same as that explained above. Even tho more than 35 million bushels of apples went into cold storage in the United States (Table 26), the active demand practically exhausted the supply before spring, and unprecedented prices prevailed toward the close of the season. This illustrates the fact that economic conditions, as well as the quantity stored, influence the profits from storing apples. In years of changing economic conditions, the quantity stored will be a less important factor in determining price.

Advantages of Pushing Fall Sales

Under normal conditions the advantages of selling most varieties of Illinois apples early and putting them immediately into consumption channels are:

1. The fruit is at its best quality during the first few weeks following harvest.
2. There is practically no loss from shrinkage or spoilage.
3. The margin between producer and consumer is much less because there is less handling and the expense of cold storage is avoided.
4. The uncertainty and risks of market changes are avoided by the grower (he has already assumed his full share of risks in producing the crop).
5. Contacts with buyers are much more readily made during the harvest season than during the winter.
6. Transportation to market by truck is much safer in fall than after severe weather arrives.
7. Competition with other fruits, particularly citrus, and with apples from other regions is likely to be more severe in the winter than in the fall.
8. The grower receives his returns earlier.

PROBLEM OF CULL APPLES

From 5 to 15 percent of the apples produced in western Illinois are normally sold to cider mills; in some years the quantity so disposed of has reached more than 22 percent. Presumably these are all culls. In 1937, 31 percent of the western Illinois late apple crop was sold as Unclassified stock; in 1939, 46 percent, and in 1941, 38 percent. How many culls were included is unknown, but it would seem reasonable to estimate that the lots of apples designated as Unclassified consisted on the average of at least one-fourth culls.

A movement has been started in the apple industry for the abolition of "Unclassified" as a designation for any kind or lot of apples and requiring that culls be designated as "Culls" and marked as such. There is a law in Missouri covering this point,[1] and there are advocates for a national law to the same effect in reference to apples moving in interstate commerce, and of similar laws in the various producing states in reference to intrastate shipments.

The suggestion has been made that legislation be enacted that would eliminate the lower grades of apples from fresh-fruit market channels in years of heavy crop, the extent of the elimination to be determined after the commercial crop of the United States has been estimated and the prevailing economic conditions and the purchasing power of consumers have been considered. If such a plan were put into practice, the markets would be supplied with only high-grade apples in years of heavy crop accompanied by light demand, and with enough apples of all grades to meet the demand in years of light crop. Production would also tend to concentrate in localities and in orchards where a high percentage of No. 1 fruit can ordinarily be produced.

Good Care of Orchards Reduces Culls

Differences in the care which owners in the same locality give their orchards greatly affect the grade of fruit they market. An owner's lack of necessary funds, combined in many cases with lack of adaptation for horticultural work, has resulted in many poorly-cared-for orchards in Illinois and consequently in the production of a considerable quantity of low-grade apples. In western Illinois five growers having poorly-cared-for orchards which produced 18,000 bushels of apples in 1937 packed only 11 percent of their fruit as U. S. No. 1 grade and sold 69 percent as Unclassified. Five other growers in the same region who had given their orchards good care and had produced

[1]New legislation pending in Missouri as this publication goes to press is designed to make possible the use of the "Unclassified" designation on apples which consist of 70 percent or more of U. S. Utility quality or better, and to reserve the "Cull" designation for apples which contain less than 70 percent of U. S. Utility or better quality.

24,000 bushels of fruit packed 72 percent of their crop as U. S. No. 1 stock and sold only 8 percent as Unclassified.

The possibility of producing apple crops in Illinois having a very low percentage of culls is illustrated by the achievements of the "Ninety-Five Percent Clean Apple Club" sponsored by the Illinois State Horticultural Society.[1]

Apple Cider and Apple Chop

Since the price paid for apples by cider-mill operators is limited by the price obtainable for cider vinegar, which in turn is limited by the price of "white" or distilled vinegar, sale of apples to cider mills can never be a source of large income to apple growers.

The manufacture of apple chop as a means of disposing of cull and surplus apples has been suggested[2] and an effort was made by apple growers in western Illinois to interest a commercial concern in the establishment of a plant for making this product, which is used extensively in the manufacture of apple butter. Three firms in St. Louis are reported to use about 2,000,000 pounds of this material a year, which they procure from the Far West or from eastern states. To make this quantity of apple chop would require about 290,000 bushels of fresh apples. The logical place to manufacture the apple chop needed by these firms and other large manufacturers of apple butter in the Middlewest was thought to be in the apple-producing area of western Illinois. However, the effort to establish an apple-chop plant in this area was unsuccessful, and the various cider mills in the area still are practically the only outlet for apples other than the fresh-fruit market.

The best solution of the cull problem in the commercial apple areas of Illinois would therefore seem to be to so manage and care for the orchards that the percentage of culls will be reduced to a minimum. Attention could then be concentrated on marketing the higher grades rather than on salvaging the culls.

PRESENT-DAY SALES OPPORTUNITIES

The sales opportunities available to different Illinois apple growers vary with their location, the size of their operations, their initiative, their sales ability, and their reputation for quality of fruit and dependable packs.

Large operators located in the distinctively commercial areas have their choice among most of the various sales outlets mentioned on page 521, particularly sales made directly to wholesale dealers or thru

[1] Ill. State Hort. Soc. Trans. **74**, 281 (1940), and **76**, 328 (1942).
[2] Farm Credit Admin. Misc. Rpt. 13, p. 62. 1937.

brokers, sales to merchant truckers, sales thru cooperative organizations, and sales thru city commission merchants.

Growers near the outer edges of commercial apple areas bordering grain and livestock areas enjoy special opportunities to sell directly to consumers, including both farm and village people. They also have opportunities to develop a good trade with retail merchants in neighboring towns.

Location near a large manufacturing or trade center, whether in an important apple-producing area or not, affords a grower special opportunities for dealing directly with either wholesale or retail dealers in that city.

In isolated areas outside of important apple-producing regions and at a distance from large trading centers, individual apple growers may need to exercise considerable ingenuity and initiative to dispose of their fruit to the best advantage. Many apple growers have worked up a good trade directly with consumers who call at the farm or at a roadside stand maintained by the grower at a main highway if the farm is not favorably located in reference to highway traffic. There are also opportunities for dealing with retail merchants in the surrounding towns within reasonable trucking distance from the orchard.

Each grower outside the important commercial producing areas will have to work out for himself the marketing method best suited to his situation and opportunities. Growers in commercial areas have opportunity for concerted action, either thru cooperative associations, the establishment of producers' wholesale markets at strategic locations in the producing area, or the attraction of wholesale buyers to the locality due to the larger volume of fruit available.

OUTLOOK FOR THE ILLINOIS APPLE INDUSTRY

The most striking thing about the apple industry in Illinois and in the United States as a whole is the great decline in tree numbers during the past thirty years. From a total of 217,100,000 trees in the United States in 1910, the number declined to 71,700,000 in 1940. In Illinois the rate of decline was even greater: from 12,400,000 trees in 1910 to 2,800,000 in 1940 (Table 27).

Recent plantings have been proportionately less in Illinois than in the country as a whole, as indicated by the number and percentage of trees not yet of bearing age. The percentage of apple trees in the United States not of bearing age in 1940 was 18.8 percent, while in Illinois it was only 15.6 percent, according to U. S. Census figures. These include trees in noncommercial as well as commercial plantings. The surveys of commercial orchards made in western Illinois in 1937 and in southern Illinois in 1938 indicated that approximately 25 per-

TABLE 27.—NUMBERS OF APPLE TREES IN THE UNITED STATES AND IN ILLINOIS, CENSUS YEARS, 1910 TO 1940

Year	All ages	Not of bearing age	Bearing age	Percent not of bearing age	Percent of bearing age
	millions	*millions*	*millions*		
		United States			
1910	217.1	65.8	151.3	30.3	69.7
1920	151.3	36.2	115.3	23.9	76.1
1925	138.0	34.3	103.7	24.9	75.1
1930	116.3	27.5	88.8	23.6	76.4
1935	100.0	17.5	82.5	17.5	82.5
1940	71.7	13.5	58.2	18.8	81.2
		Illinois			
1910	12.4	2.5	9.9	20.2	79.8
1920	6.9	1.8	5.1	26.1	73.9
1925	6.7	2.6	4.1	38.8	61.2
1930	5.5	1.8	3.7	32.7	67.3
1935	4.8	.9	3.9	18.7	81.3
1940	2.8	.4	2.4	15.6	84.4

cent of the trees in such orchards were less than ten years old—the age at which apple trees in this state are considered as of bearing age. It is probable that even in the commercial orchard areas the percentage of trees not of bearing age was less in 1940 than in 1937 and 1938.

The present trend in apple production is downward, tho the decline in production is not nearly so great as the decline in tree numbers. This is true largely because the trees removed were neglected, diseased, unproductive, or in noncommercial plantations, while those remaining have been given better care and are producing larger crops per tree than the average production per tree in past periods.

The trend of total production will probably continue downward, however, for some years because of the light plantings during the past ten years and the consequent small numbers of trees coming into bearing to replace those which will normally pass out of production. It is significant that in the Pacific Coast area, which offers Illinois growers the severest competition in the winter-apple market, only 8.2 percent of the apple trees were not of bearing age in 1940. This means there are not nearly enough young trees coming on for normal replacement, and that production in that region is likely to decline more rapidly in the future. With the present lack of export outlet for Pacific Coast apples due to war conditions, relatively few new plantings are likely to be made in that region.

The outlook for the Illinois apple grower is the brightest it has been since the harvest season of 1929. This is because of (1) the favorable location of the Illinois commercial apple areas in reference to available markets, (2) the probable decline in the total apple production of the country and the increased buying power of the American people, (3) the stress being placed upon the use of fruits in the civilian diet.

Growers who give their orchards the necessary care to produce a high-grade product, prepare that product properly for market, and intelligently make their market contacts, are in a position to prosper during the years immediately ahead.

SUMMARY

1. Illinois has long been and still is an important apple-producing state. Illinois growers are in a strategic position in reference to markets: their best varieties of early winter apples mature in advance of those from most other important producing regions; there are available markets in all directions from the Illinois producing areas; the markets to the west have recently assumed increased importance.

2. The most favorable time for putting the principal volume of most varieties of Illinois apples into consumption appears to be the fall months, in spite of competition at that time with other fruits and to some extent with apples from other areas. Stimulating consumption in the fall by making good market grades of high-quality apples generally available at that time is a better policy than saving back the good apples for later sale. Late-keeping varieties, like Willow and Winesap, may sometimes be stored to advantage.

3. At least ten different sales outlets are available to Illinois commercial apple growers. The more important of these outlets are direct sales to wholesale dealers, sales thru brokers and thru cooperative organizations, and direct sales to merchant truckers.

4. A large percentage of the Illinois apples marketed in packages are of U. S. No. 1 grade. In 1939 these netted the growers better average prices when sold thru brokerage firms or cooperative organizations than when sold thru any of the other outlets which take relatively large volumes of fruit. For certain varieties, however, direct sales to wholesale dealers proved most advantageous.

5. Government purchases of Illinois apples for relief purposes have been exceedingly small, but the presence of a purchase program in 1941 undoubtedly had a stimulating effect on the market. Usually, however, Illinois growers have been able to realize better prices thru the regular outlets available to them.

6. Delicious and Golden Delicious in the packaged fruit have normally brought better prices than any of the other important Illinois varieties. Apple prices in general were much better in the fall of 1941 than for several preceding crop years and were still better in 1942.

7. Large quantities of late-crop Illinois apples are handled in bulk or trucked to market in open crates; growers are thus relieved of the

expense of packages and packing. Merchant truckers have been especially active in moving bulk stock.

8. Production of apples in Illinois is principally in well-defined commercial areas and is confined largely to a few well-adapted, well-known varieties, either of high quality as table fruit or particularly adapted to important special uses, as for pies or sauce.

9. Many growers outside the principal commercial producing areas have special market opportunities for developing direct trade with consumers or with retail dealers.

10. Standardized grading and shipping-point inspection are well established in Illinois and are maintained by the Division of Markets of the State Department of Agriculture.

11. Better orchard management that will reduce the percentage of culls in the crop would be a more effective means of solving the cull problem than seeking new or enlarged outlets for the culls. Attention could then be concentrated on marketing the higher grades rather than on salvaging the culls.

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